PAINT and VARNISH

THE TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHES

GET HELP WITH RESINS

from Neville's Technical Service Department

If you manufacture paints, varnishes or allied products, the chances are you use coumarone-indene or petroleum resins in at least some of your formulae. As a leading source for these resins for many years, Neville continuously develops new variations to match ever-expanding applications. If you have been using the same resin types in your formulae over a period of years, are you sure you are still getting the highest quality results for the lowest cost? Why not let Neville's Technical Service Department help you satisfy yourself? There will be no obligation or breach of confidence . . . only a letter or a phone call is necessary.

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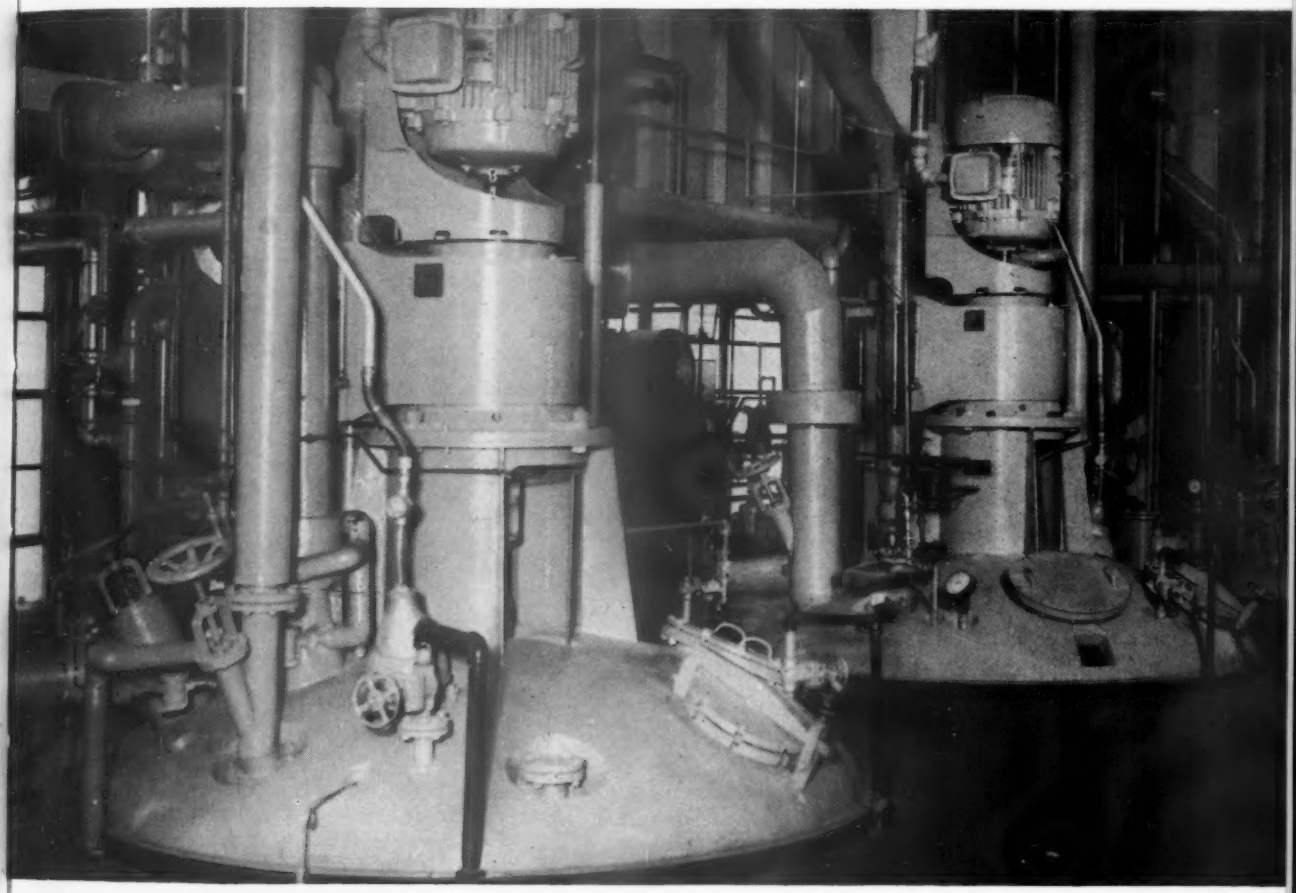
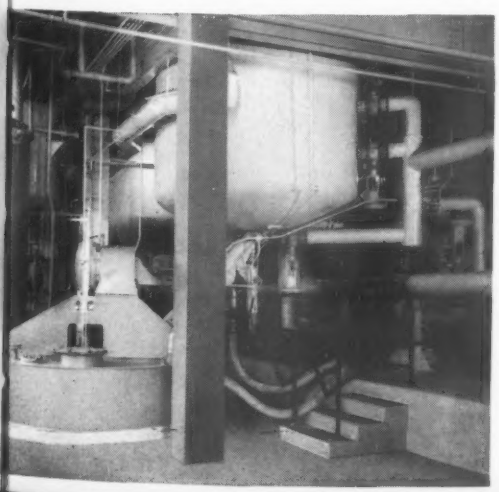
in processing synthetic polymers for RINSHED-MASON at Detroit



Patterson SYNTHETIC RESIN SYSTEMS



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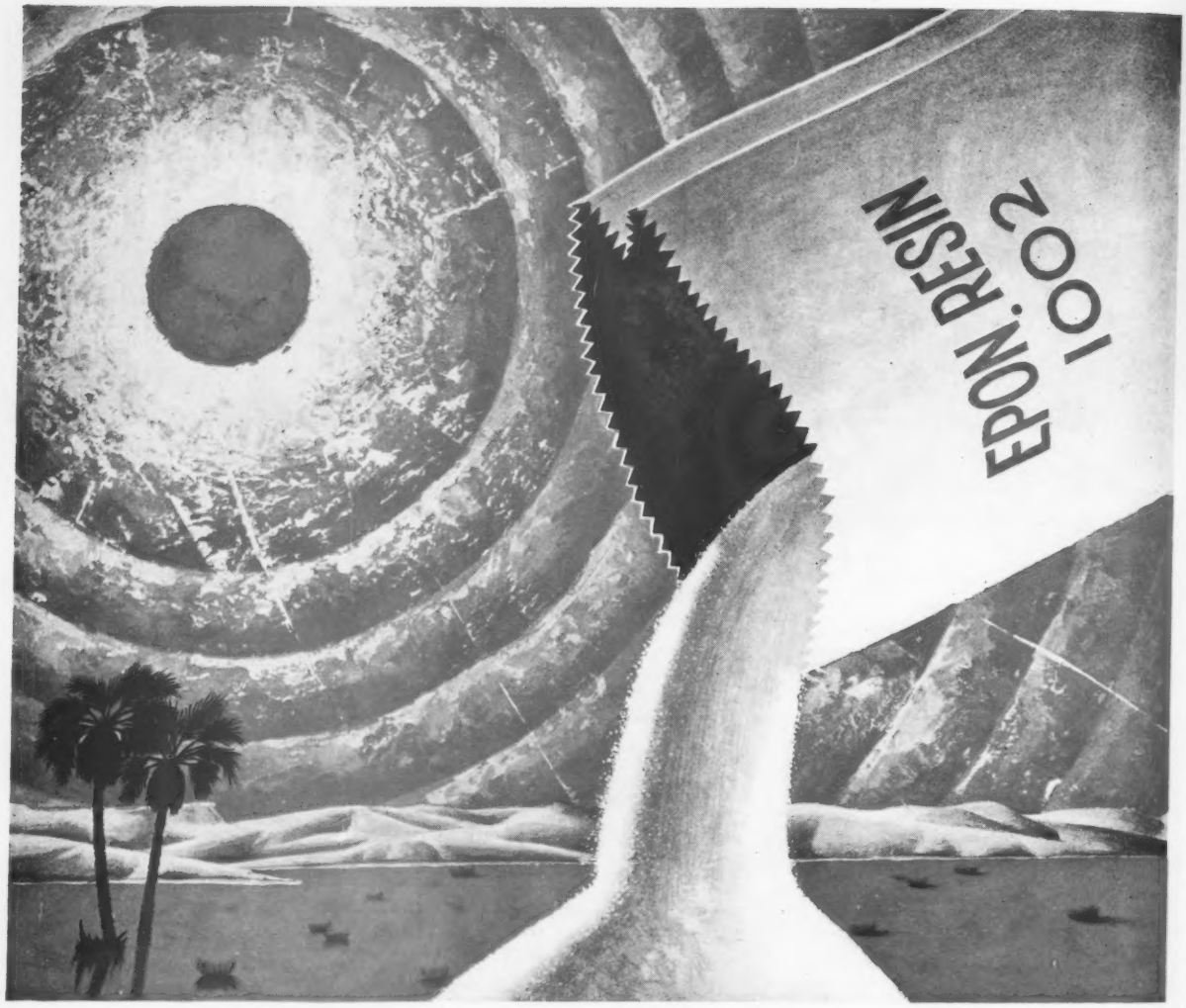

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EDITORIAL COMMENT

See You in Atlantic City

THE week of October 18-24 will be a busy one for members of the paint industry as both the National Paint, Varnish and Lacquer Association and the Federation of Paint and Varnish Production Clubs will hold their respective meetings in Atlantic City. This is the first time since 1954 that both paint organizations are meeting in the same city during the same week.

This year marks the 72nd meeting of the National Association. An interesting program has been arranged for the three-day period, October 19-21.

Featuring the opening day's program will be President Battley's annual report and a keynote address by Senator Jacob K. Javits of New York. Of particular interest will be three interesting forums scheduled for Monday morning. These include the Roof Coating and Roof Cement Manufacturers' Forum, The Legislative Forum and the Advertising and Sales Promotion Managers' Forum.

Tuesday will be devoted to Trade Sales and Chemical Coatings Management Workshops. These "Work Shop" sessions will comprise of small groups discussing specially selected subjects under the direction of qualified leaders. Two general forums, "Creative Selling" and "Keep It Legal" have also been scheduled for Tuesday. The "Hidden Power" Sales Training Program and a talk by Leo Cherne entitled, "The Summit—The Dollar—The Market—The Future" will round out the final session on Wednesday.

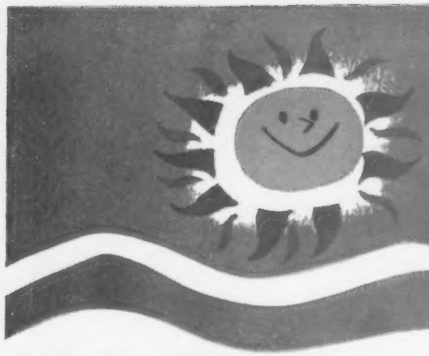
As in the past, technological excellence will characterize this year's Federation meeting. The 1959 Joseph J. Mattiello Memorial Lecture will be presented by Vincent C. Vesce, technical director of Harmon Colors of Allied Chemical's National Aniline Division. Mr. Vesce has been a pioneer in the development of new organic pigments, in the improvement of standard pigments, and in the expansion of the use of organic pigments. The subject of his lecture will be "Exposure Studies of Organic Pigments in Paint Systems."

The keynote address will be delivered by Herbert B. Woodman, president of Interchemical Corp. The topic of his address will be "What's Past is Prologue."

Panel discussions dealing with Fire Retardant Paints, Conventional Exterior Paints vs. Emulsion Exterior Paints and Dispersions will be featured at this meeting. A highlight of the program will be a dramatic demonstration on the Magic of Fire conducted by the U. S. Bureau of Mines. In addition, several interesting Club and Roon Award papers will be presented.

The latest developments in materials and equipment for the coatings industry will be presented by the 106 exhibitors at the 24th Paint Industries' Show, the largest ever staged. For the ninth successive year, a Lacquer Information Center is a feature of this year's show. The exhibit, presented through the cooperative effort of suppliers of materials for lacquer, will depict the latest developments in lacquer technology, formulation, and application.

Beside introducing new materials and equipment, the Paint Industries' Show serves as a focal point where technical and production men can look for answers to their problems. Since technical representatives will be available at all times, this show presents an excellent opportunity for one to review, at one time, the most recent developments in raw materials and equipment. The interchange of ideas between the paint manufacturer and supplier has always been an important factor in the technological development of the paint industry.



WHEN YO
PAIN

Review **ADM's** Moder
Relax in the Parl

ATLANTIC CITY, OCT. 21-24 (APP)

Attention Pooped People! This means you, when your "achers" have trod the boardwalks, exhibit aisles and hotel corridors at the Paint Industries Show.

ADM's famed "Pooped People Parlor" offers you succor. Also, soft drinks, a whiff of straight oxygen and a revitalizing snort of virgin tomato cocktail. Still your quivering eyeballs with plenty of aspirin, and the seltzer twins Alka and Bromo. Enjoy a soft vibrator chair for your aching back, and a foot massage for your sore feet.

You'll rush out with renewed vigor to enjoy yourself at the ADM Hospitality rooms. Room locations posted at the ADM exhibit booth, No. 716.

YO VISIT THE
AIN SHOW

oder ehicle Progress . . .

Parlo or Pretty Pooped People

(pooped PRETTY people also welcome)

Watch for the Unveiling of a Superfast New Air-Dry Resin

Run, don't walk, to booth 716 at the Paint Show. Be one of the first to see the unveiling of ADM's amazing new air-dry resin. Not because it's new, but because it's faster. ADM's new Aroplaz 6006 is a brand new resin that air-dries with the speed of lacquer. Tough? Yes! Durable? Yes! And it saves coating time, cost, and dust contamination on either finishing or re-finishing jobs for appliances or equipment.

You'll also want to examine ADM's complete line of exterior vehicles and Arolon water reducible resins. See you at the Paint Show, Booth 716!

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Archer QUALITY

Resin and Plastics Division
729 Investors Building • Minneapolis, Minnesota

COLORLESS

at the start

COLORLESS

in the finish

Sucrose Acetate Isobutyrate, new resin modifier-extender, exhibits low color *and* excellent color stability

Sucrose Acetate IsoButyrate (SAIB) is an unusual compound of immediate interest to all who are concerned with the formulation or performance of protective coatings.

Consider these characteristics:

Its color and clarity are a sparkling water-white.

Its color stability on exposure to ultraviolet light is excellent.

Its color stability on prolonged heating is excellent. Example: samples heat-aged 6 days @ 350°F showed only a 9 Gardner color change, from 1 to 10.

Its color stability in the presence of other lacquer ingredients is excellent. Example: in metallic pigmented lacquers, SAIB does not produce a "greening" effect with bronze powder.

Lacquer film formers may be highly modified with SAIB and still show unusually good film tensile properties and hardness. The low solution viscosity of SAIB permits formulation of high-solids lacquers at application viscosities. Higher non-volatile content results in greater coverage per gallon of lacquer and reduced solvent requirements. Formulas are often simplified, too, through replacement of several lacquer-modifying components with SAIB. Film adhesion and permanence is improved in many cases.

To see how easy SAIB is to use, and how little it affects film properties while significantly increasing solids content, simply add it to your present lacquer—try 5 to 10% by volume of total lacquer to start with—spray it, and observe the result.

SAIB has been evaluated in standard formulations for melt coatings, for wood lacquers, paper coatings, cloth coatings, metal lacquers and lacquers for plastics.

For example, nitrocellulose *wood lacquers* containing SAIB show an unusually high film hardness, even at high modification. In Half-Second Butyrate coatings its presence gives an unique visual depth of finish. In *paper coatings*, its use results in very high gloss and good adhesion. In *cloth coatings*, abrasion resistance and appearance are improved. The freedom of color of SAIB is often a distinct advantage in formulating *lacquers for plastics*. In *vinyl and acrylic solutions*, replacement of part of the film former with SAIB improves sprayability and decreases cobwebbing. In *hot melt coatings*, SAIB greatly extends the basic film former.

Few commercial compounds so high in molecular weight display so compact a structure. The outstanding stability of SAIB is attributed to this dense molecular configuration.

Another unusual property of SAIB is its extremely high viscosity at room temperature and sharp decrease in viscosity with addition of heat or solvents. At 30°C, its viscosity is about 100,000 centipoises. At 100°C, the viscosity drops to 90 centipoises. A 90% solution of SAIB in Tecsol®, Eastman proprietary ethyl alcohol, exhibits a viscosity of only 750 centipoises at 30°C.

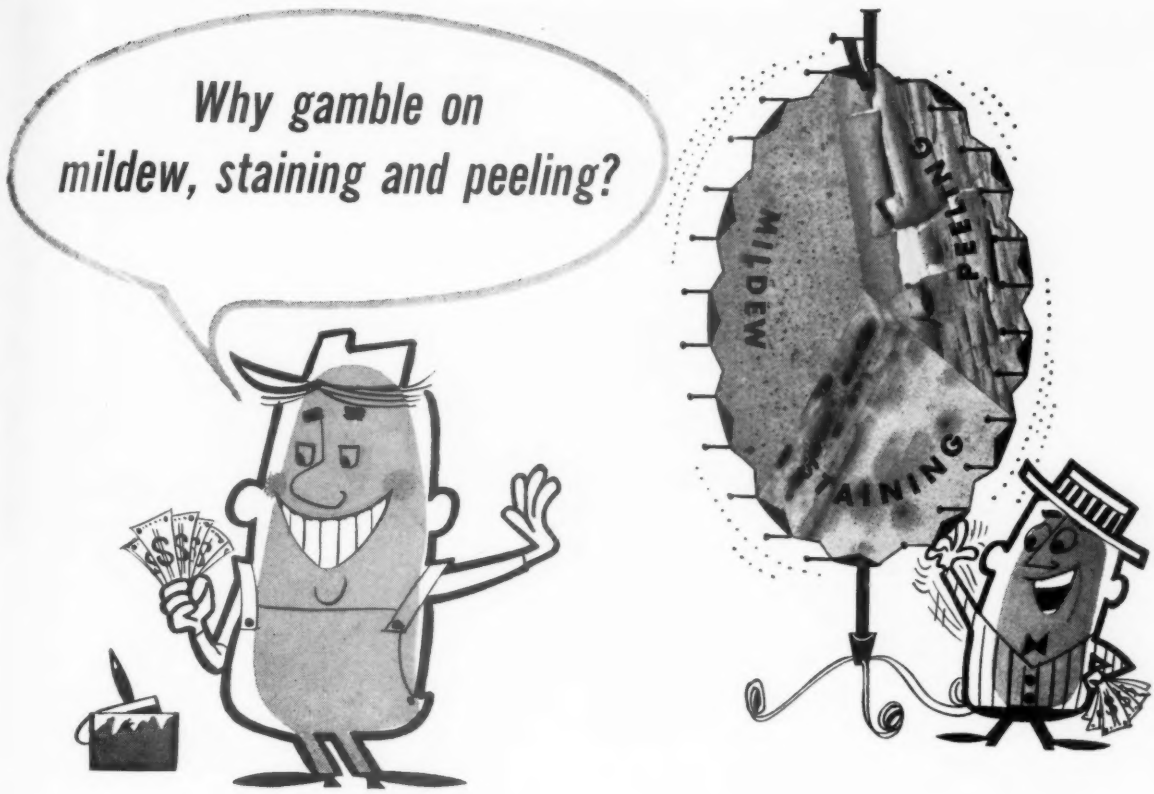
For handling convenience, SAIB is sold both as a 90% low-viscosity solution, designated *SAIB-90*, and in the 100% unmodified form, designated *SAIB*.

Many other coatings applications for SAIB are being investigated by our Customer Service Laboratories. May we help you evaluate this unique material? For this service or for a sample of SAIB, write to Chemical Sales Development Department, Chemicals Division, Eastman Chemical Products, Inc., Kingsport, Tennessee

SAIB

SUCROSE ACETATE ISOBUTYRATE

Eastman CHEMICAL PRODUCTS, INC., KINGSPORT, TENNESSEE subsidiary of Eastman Kodak Company



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in flat house paint formulations!

New low-luster or flat-breather type house paints have been able to solve some of the problems posed by wide differences in today's building materials, but they also have created other hazards—discoloration by mildew growth, unsightly staining and peeling.

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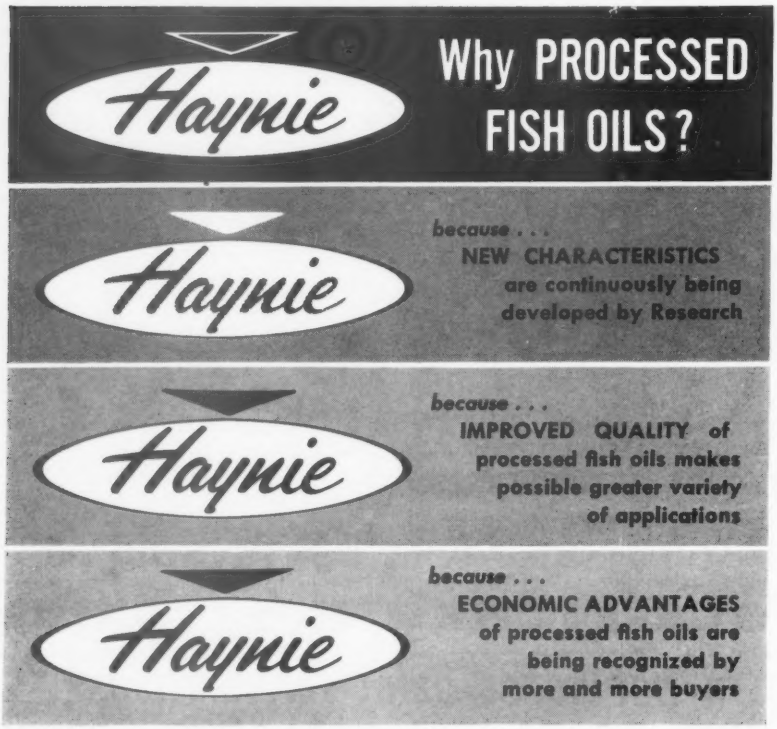
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For complete information on our latices and how they can help you, write today. Samples, formulations and technical service are available upon request.

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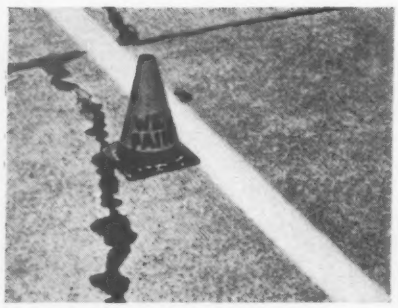
6 ways to measure your paint's sales appeal in the traffic paint market

1 **Does it have good visibility?** Here, in the heart of a Midwest city, traffic stripes are subjected to constant wear. Stripes above —after 4 months' service—retain excellent visibility. Paint is based on PLIOLITE S-5.



2 **Does it dry rapidly?** Stripe shown here is 5 inches wide — was applied with paint based on PLIOLITE S-5. Stripe was dry to the touch in 20 minutes—ready for traffic in 40 minutes.

3 **Does it resist bleed-through?** Paint based on PLIOLITE S-5 was used to mark center line on this newly constructed asphalt highway. Notice there's no evidence of bleed-through on either side of the stripe.

4 **Will it withstand weathering, chemicals?** Resistance to alkalies in concrete, snow removal salts, and weathering are key advantages of PLIOLITE S-5 formulations. Stripes below are shining examples of these advantages.

5 **Does it have good surface wetability?** This was a prime requisite of a West Coast state which — because of its high annual rainfall — must often apply stripes when roads are damp. State chose paint formulation based on PLIOLITE S-5.

6 **Is it economical over the long haul?** One city's selection of a marking paint was based on this formula: cost per foot per day of useful life. After months of careful testing, the city chose PLIOLITE S-5 formulation.

IF YOU WANT to increase your paint's sales appeal—and your share of the marking paint market—find out about the important difference in paints based on PLIOLITE S-5. Ask, too, about PLIOLITE VT, another outstanding Goodyear synthetic resin. Full details—including latest Tech Book Bulletins—are yours by writing: Goodyear, Chemical Division, Dept. J-9450, Akron 16, Ohio.

GOODYEAR

CHEMICAL DIVISION

Pliolite—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

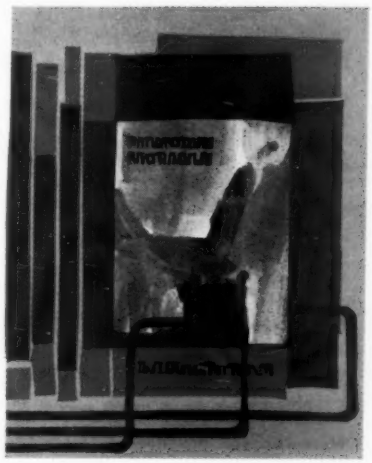
PROBLEMS AND SOLUTIONS IN LACQUER TECHNOLOGY...

one of a series of advertisements designed to acquaint formulators with the properties and applications of the various types of cellulose acetate butyrate.

Which type of cellulose acetate butyrate would you select for this coating problem?

PROBLEM:

To formulate a premium lacquer for coating paper-back book jackets



ANALYSIS: To give maximum visual appeal to books on display, the lacquer must produce a coating that is clear, colorless and high in gloss. Secondly, because pocket books are exposed to sunlight in store windows for extended periods of time, they must be coated with a lacquer that will not discolor upon aging. Normally, pocket books are subjected to considerable abuse in handling, too; consequently, the lacquer must be tough, flexible and scuff-resistant. Good adhesion to inked surfaces is another requirement. The lacquer must not block at temperatures up to 300°F. And, finally, it must be easy to formulate and adaptable to conventional finishing techniques.

SOLUTION: In order to attain a coating with the required high blocking resistance, it is necessary to incorporate a cross-linking thermosetting resin. Excellent resins for this purpose are based on urea formaldehyde. These resins, when properly catalyzed, cure at the temperatures and times used by paper coaters, yet lacquers containing them exhibit good pot life—3 to 4 days.

Of the four types of butyrate film formers available, let's rule out EAB 171; for, being low in butyryl content, it is least compatible with urea formaldehyde resins. On the other hand, EAB 500, the highest butyryl content ester (50%), is not the answer either as it produces relatively soft films.

Our choice lies, therefore, between EAB 272 (butyryl content: 27%) and EAB 381 (butyryl content: 38%), as both of these types produce films that meet the requirements of this lacquer application for flexibility, toughness, scuff resistance and adhesion.

EAB 381 has greater tolerance for various lacquer solvents and permits formulation of lacquers with higher solids content than does EAB 272. This is especially true of the low-viscosity grade, EAB 381-½, commonly known as Half-Second Butyrate. For this application it appears to be the most suitable type of cellulose acetate butyrate.

In common with all butyrate film formers, Half-Second Butyrate produces clear, colorless, high gloss coatings that do not discolor or yellow upon aging or exposure to sunlight.

Eastman cellulose acetate butyrate is free-flowing and non-hazardous in storage. It is shipped as a fine dry powder in 50-pound multi-wall paper bags. Your request for help on a specific formulation problem is welcomed by your Eastman representative.

Authoritative, detailed information on the various types of cellulose acetate butyrate, including their chemical composition, physical properties and their use as film formers in metal lacquers, wood finishes, and textile and paper coatings is contained in Eastman's 72-page booklet, "Cellulose Acetate Butyrate for Protective Coatings." It is a comprehensive, complete source file of fundamental information, reporting the results of years of work in formulating, testing and evaluating coatings based on cellulose acetate butyrate. Make sure a copy is always at hand by writing to the address below for yours.

Eastman CHEMICAL PRODUCTS, INC.

subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE

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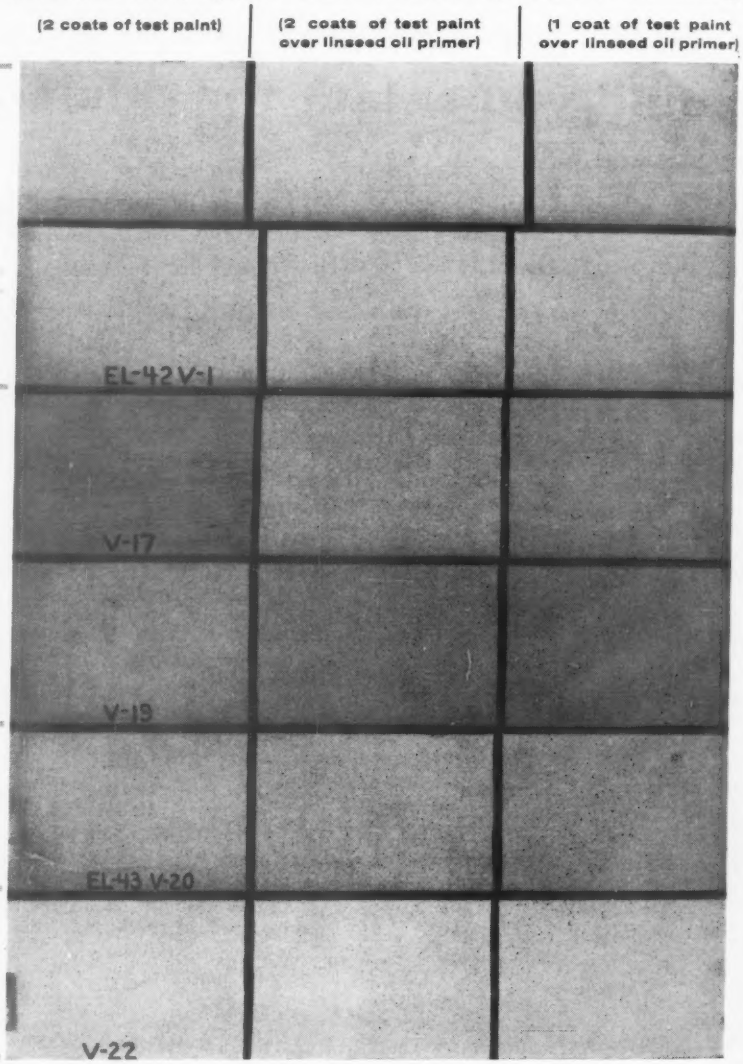
With Du Pont Elvacet® Polyvinyl Acetate Emulsion you can new wood that gives superior

See for yourself . . .

RED CEDAR (3 years' south vertical exposure in Delaware)



POLYVINYL ACETATE

"ELVACET" 1423 (30% PVC)

Note: Excellent condition . . . there is some cedar stain on left section, which is self-primed.

"ELVACET" 81-900 (28% PVC)

Note: All three sections are in excellent condition.

ACRYLIC

ACRYLIC (50% PVC)

Note: Self-primed section on left has failed. The cost of this acrylic paint is comparable to that of the PVA paint (above).

ACRYLIC (25% PVC)

Note: All sections are in good condition, but this paint *costs about 33% more* than PVA paints above. Note dirt collection.

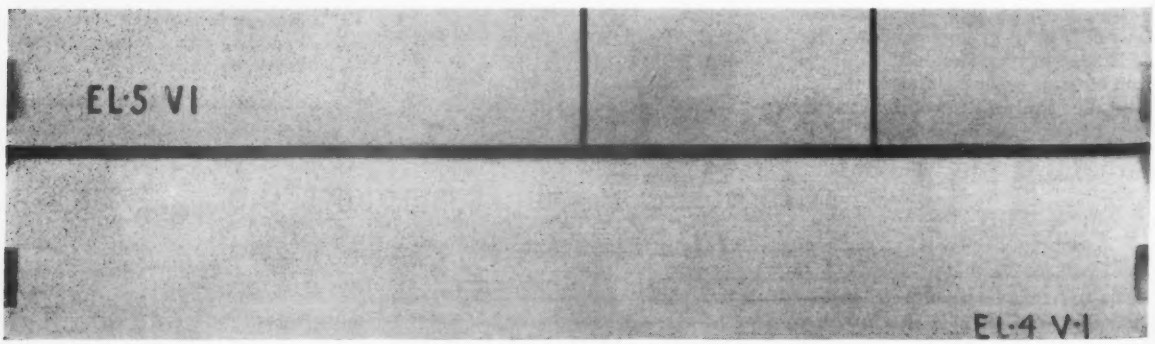
ALKYD FLAT

Note: Left section (2 coats) is in good condition. There is some cracking in other two.

LINSEED OIL

Note: This self-cleaning paint is in good condition. See the chalk wash down over the black code number.

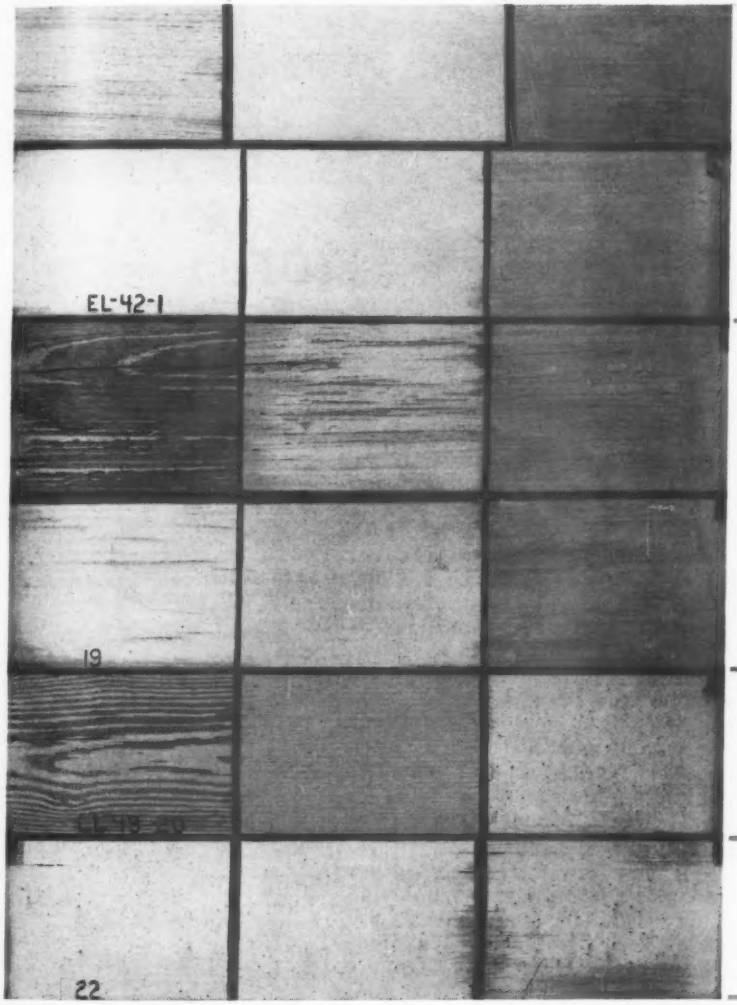
RED CEDAR (5 years' south vertical exposure)



make a water-based paint for performance at lower cost!

SOUTHERN YELLOW PINE (3 years' 45° south exposure in Delaware)

(2 coats of test paint	(2 coats of test paint over linseed oil primer)	(*Control*—coat of linseed oil primer; coat of linseed oil house paint)



POLYVINYL ACETATE

"ELVACET" 1423 (30% PVC)

Note: Left self-primed section is beginning to fail—center section over oil primer is in good condition—control paint has failed by erosion and cracking.

"ELVACET" 81-900 (28% PVC)

Note: Both PVA "test paint" sections are still in good condition, while the control paint has failed.

ACRYLIC

ACRYLIC (50% PVC)

Note: Both "test paint" sections have completely failed. The cost of this paint is comparable to that of PVA paint used above.

ACRYLIC (25% PVC)

Note: Excessive dirt collection. While this acrylic paint is in fairly good condition, it *costs about 33% more* than the "Elvacet" base paint (above).

ALKYD FLAT

Note: Both self-primed and oil-primed sections have shown severe failure.

LINSEED OIL

Note: All three sections show the effects of erosion and cracking, plus excessive mildew and dirt pickup.

POLYVINYL ACETATE

Note: Based on "Elvacet" 81-900 (27% PVC)—left and center sections are in excellent shape (left is 2 coats of test paint; center is 2 coats of test paint over oil primer). Right section (one coat of test paint over oil primer) needs repainting.

LINSEED OIL (entire panel)

Note: Conventional linseed oil house paint is eroded through to the primer, and panel should be repainted.

FOR MORE INFORMATION: Call nearest Du Pont district office: Baltimore • Boston • Charlotte • Chicago • Cincinnati • Cleveland Dallas • Detroit • Los Angeles • New York • Phila. • San Francisco . . . or write: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Vinyl Products Division, Wilmington 98, Delaware.

ELVACET®

polyvinyl acetate emulsion

DU PONT

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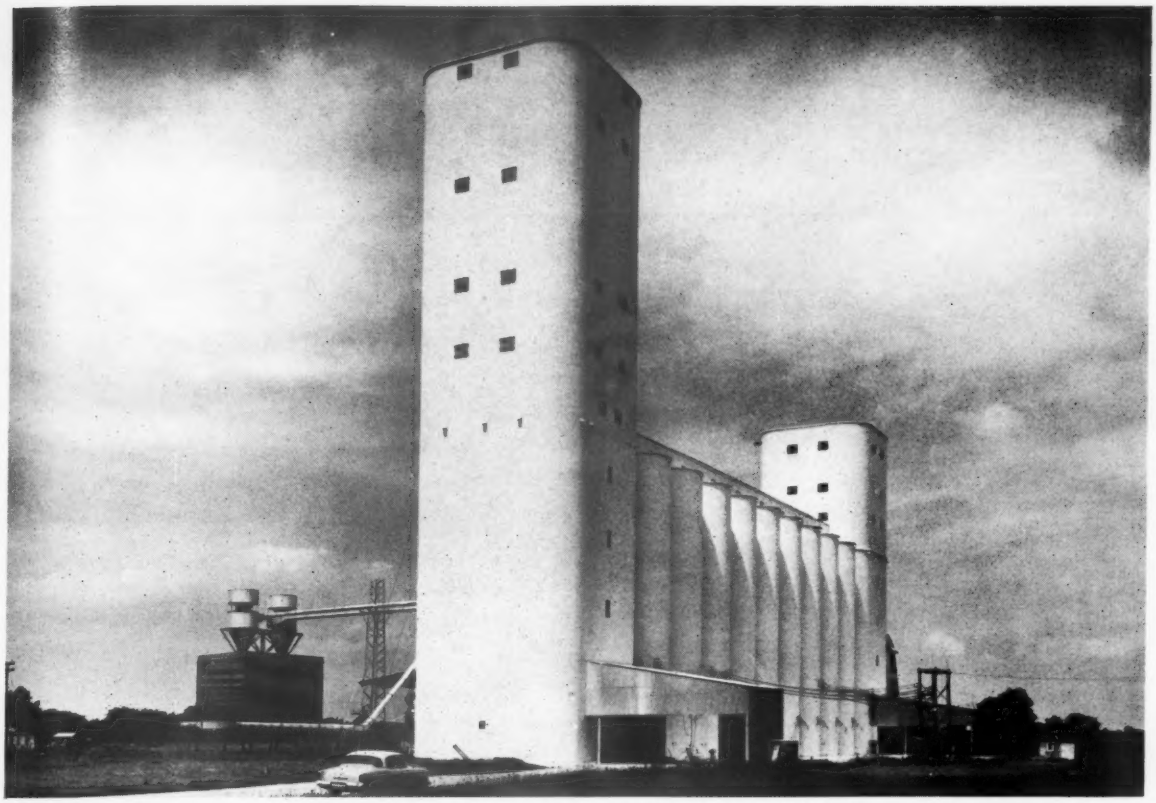


Photo courtesy James C. Ellis Grain Company, Henderson, Ky., and National Paint & Oil Company, Nashville, Tenn.

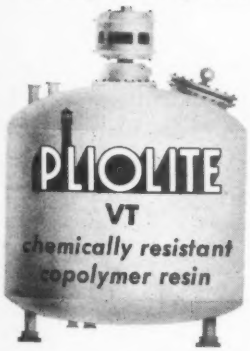
Here's long-term coverage against alkali attack!

Before painting this giant grain elevator, the firm's management decided to test all masonry paints recommended for the job. A sample of each paint to be evaluated was applied to an exterior section of the building—and left there for one year.

At the end of the year, the samples were compared to determine which paint offered the greatest protection against alkalies and moisture. Winner: a masonry paint based on PLIOLITE VT, Goodyear synthetic resin. More than 2,700 gallons were sprayed on these huge concrete structures.

Besides outstanding alkali resistance, paints made with PLIOLITE VT can withstand the most severe weather conditions – apply easily – dry rapidly – have good color uniformity.

For all the facts on PLIOLITE VT—including latest *Tech Book Bulletins*—see your Goodyear Chemical Division Representative. Or write: Goodyear, Chemical Division, Dept. J-9450, Akron 16, Ohio.



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CHEMICAL DIVISION

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THOUGHTS ABOUT PROFIT...

"He who seeks for gain must be at some expense"

PLAUTUS

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A careful analysis of the comparative values of polyols will, we believe, indicate the advantages of placing your pentaerythritol requirements with Hercules.

SP59-3

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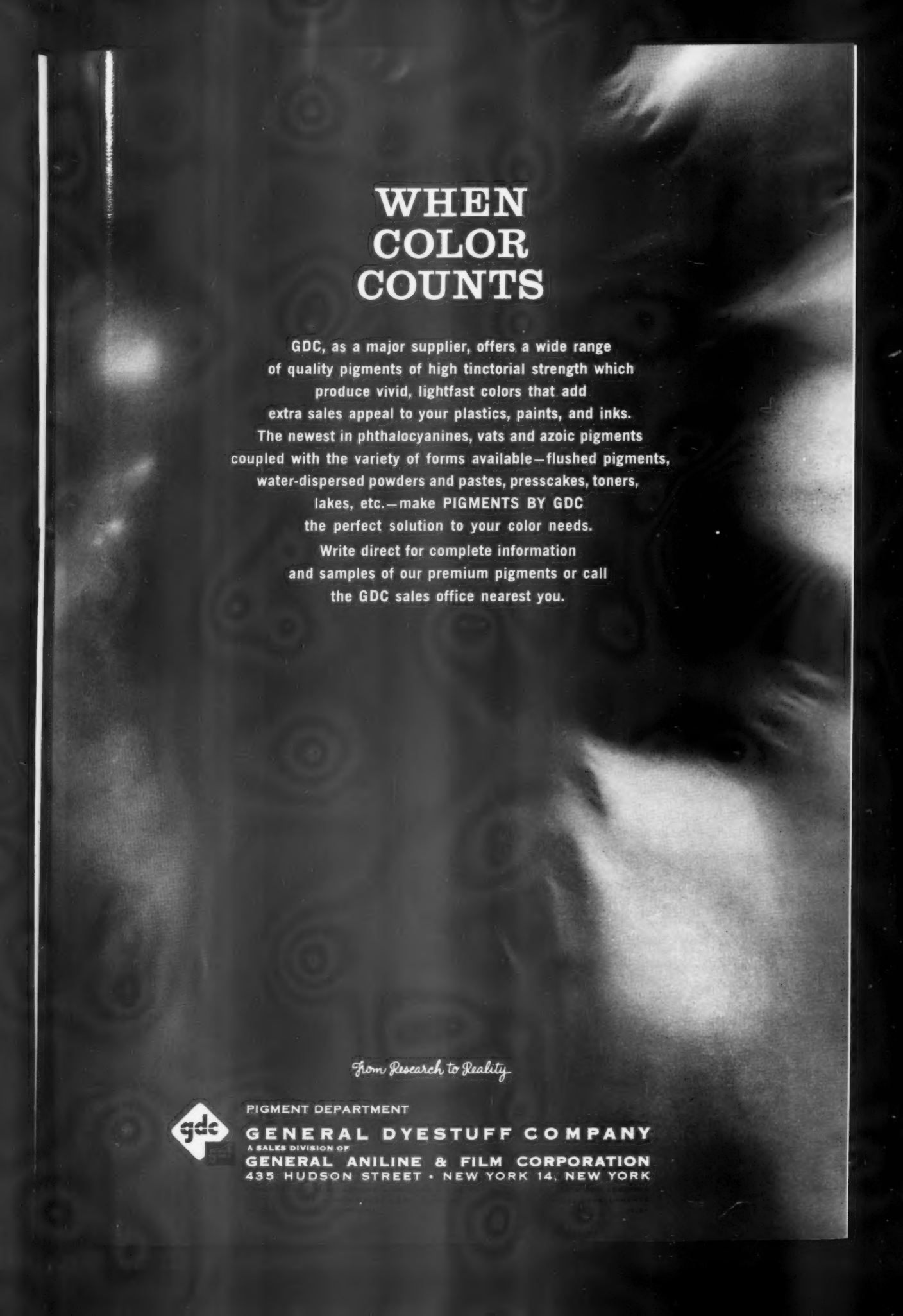
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Claims of "easier, faster application" for the water-based outside house paints fail to stress the fact that when repainting a typically chalky wood surface, a prime coat is required. AND two finish coats are recommended for best results.

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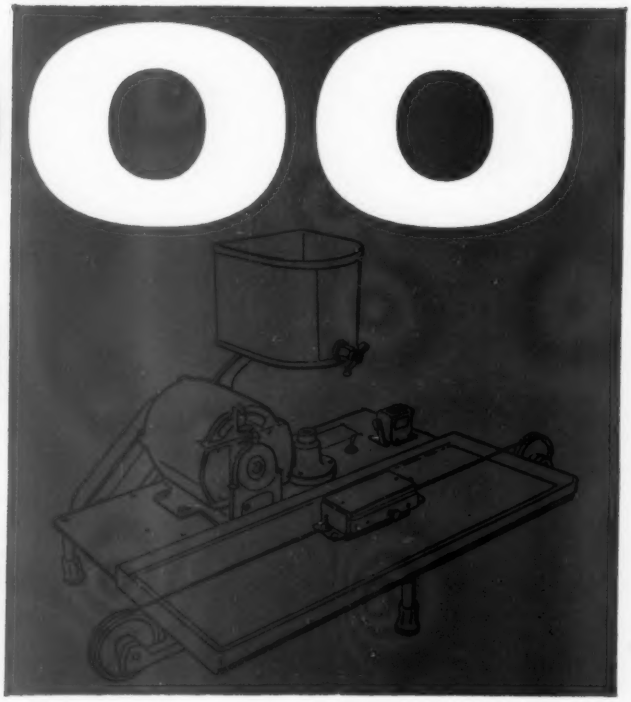

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Where necessary to meet your requirements we can select within grades the *exact* degree of desired oil absorption.

NOTE: AZO paint grade zinc oxides available as AZODOX (de-aerated). AZODOX has twice the apparent density, half the dry bulk of conventional oxides.

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American Zinc was the first, *and is still the only* producer of acicular lead-free zinc oxides covering a wide range of oil absorptions from high to low *and including the intermediate ranges.*

For Example:

When high consistency is wanted, use . . .

AZO ZZZ-22

This is the original high oil absorption acicular zinc oxide. The unusual weathering properties imparted to paints by AZO acicular type zinc oxides are present to the highest degree in AZO ZZZ-22.

When very low consistency is wanted, use . . .

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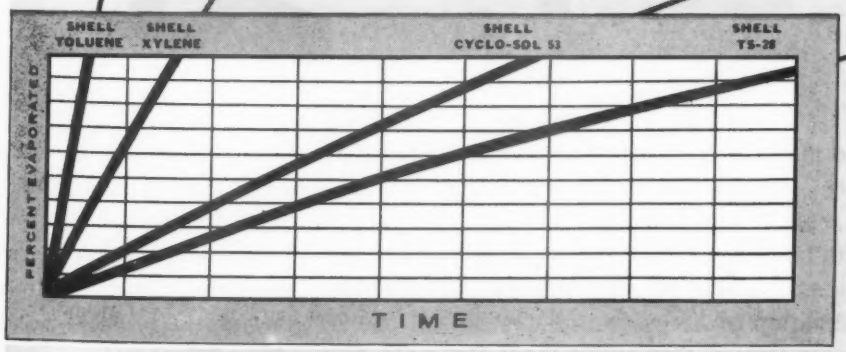

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  From a tough, flexible film to a hard, impact-resistant finish.

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  Vastly superior to other coatings while retaining the best combination of most desirable properties.

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  In this property Urethane coatings are superior to any *general purpose* coating. They excel particularly in exposure to chemical atmospheres, salt spray, greases and oils.

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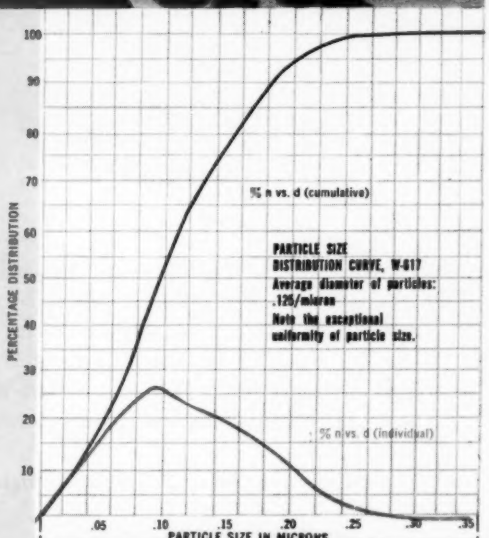

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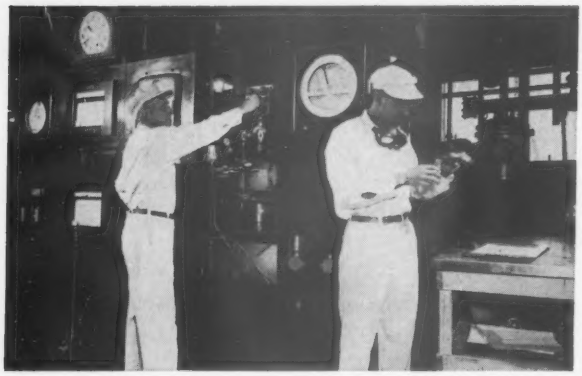

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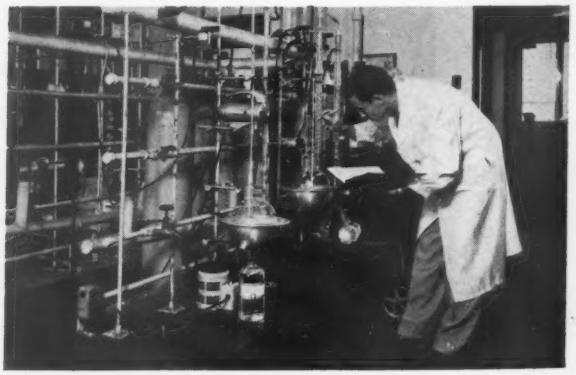

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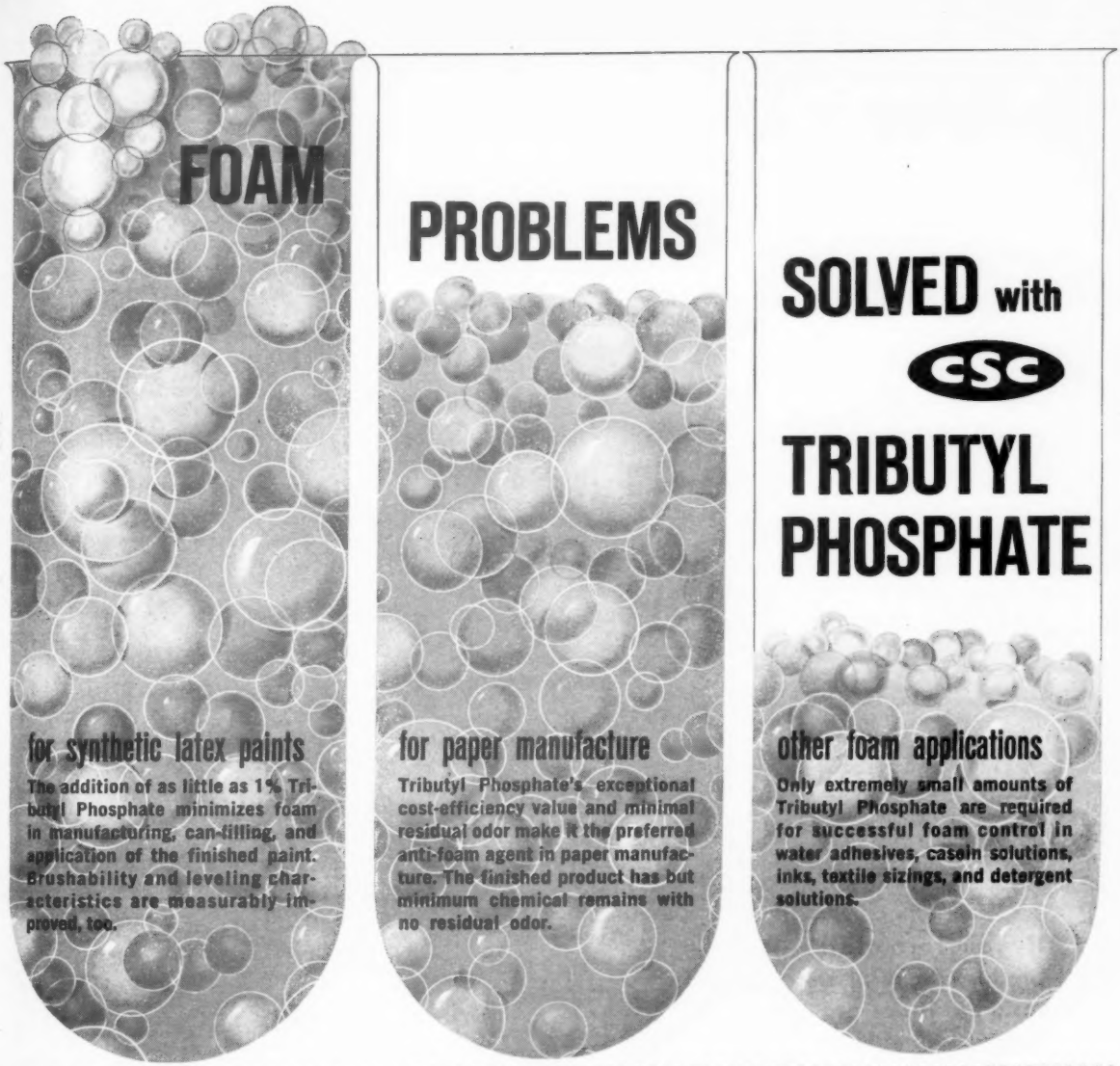

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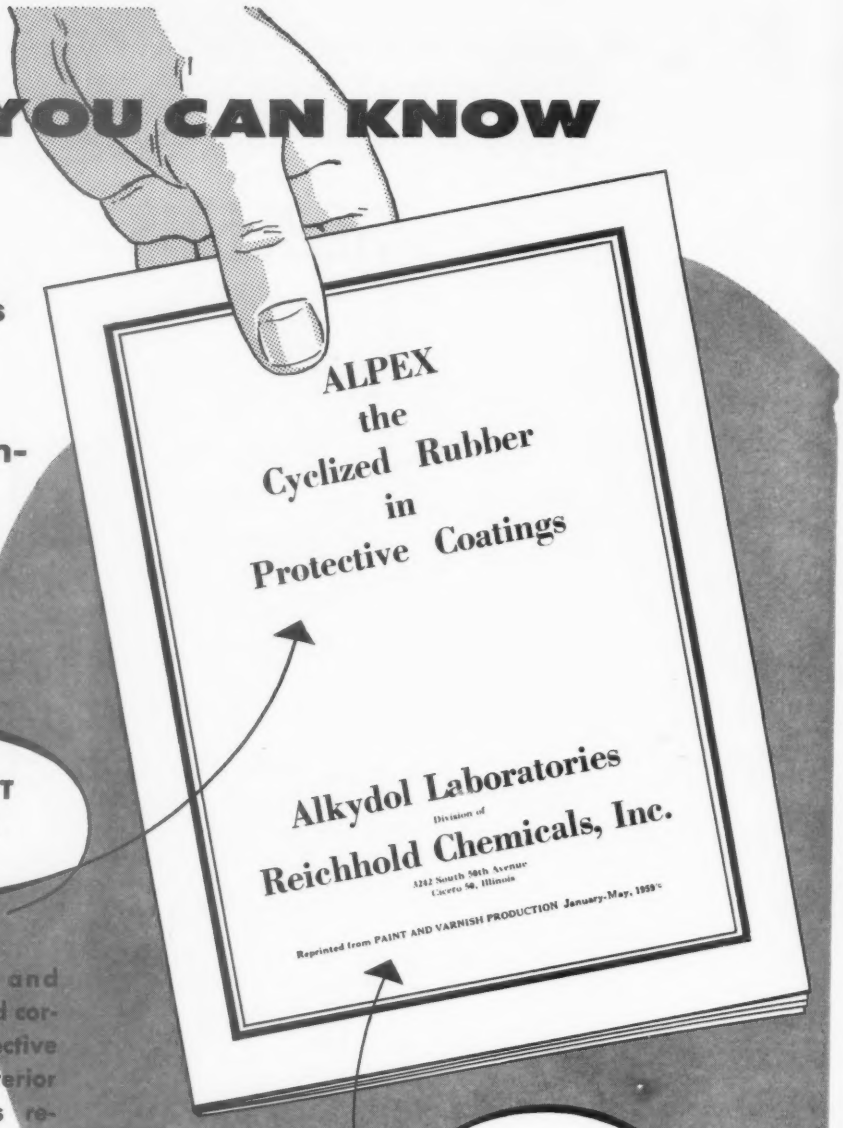

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MATERIAL HANDLING in PAINT MANUFACTURE

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FOREWORD

ONE operation which is constantly going on in the manufacture of any product is material handling. Material handling adds nothing of value to the product itself but cost. Yet it is an important factor in the distribution, merchandising and selling of a product.

Of particular importance is the use of material handling systems in combatting today's high operating costs. In the wake of rising labor costs, material handling is commanding the attention of all plant managers and is now considered an essential phase of plant operation.

The production of paint involves the use of large volumes of various kinds of raw materials. These materials have different physical forms and properties. Many of them are volatile and inflammable. To move and store these materials requires considerable knowledge of the characteristics of such materials to ensure a minimum hazard exposure.

Another important facet of material handling is efficient warehousing. To maintain their competitive position, many firms must manage their inventories carefully. Space considerations, labor costs and equipment needed to handle and rehandle materials must be constantly evaluated in order to obtain a flexible inventory control system.

Within recent years, the consumption of paint has increased steadily. Moreover, the number of different paint products sold has risen precipitately. To cope with these trends, paint manufacturers must add new product lines in a variety of colors and package sizes. As a result problems in warehousing, production and shipping arose which could only be solved through efficient handling methods.

The articles which follow are designed to bring you up-to-date on the various types of material handling equipment which are available and their possible use in paint manufacture. It is our sincere hope that these special features will reveal to you many thought-provoking ideas and help you achieve increased plant efficiency through modern material handling systems.

The Editor

WAREHOUSING

By
David W. Chase

ALL industry is turning its attention today toward warehousing. Material handling, storage methods, order filling and paperwork are getting increased attention. Efforts are being made to refine and automate all possible warehouse functions.

Many companies are planning tremendous expansion in warehousing facilities. They want the best they can get. Other companies which already have adequate warehouse facilities are refining and automating their warehousing operations to obtain greater efficiency, lower costs, and better service for themselves, or for their customers.

The problems encountered in warehousing vary considerably from one industry to another. For example, the wide variety of entirely different products handled by a large mail order house necessitates a larger variety of handling and storage methods than is necessary for a large household appliance manufacturer. The mail order house must handle and store all the household appliances of the company, plus many other products. A company manufacturing brooms might have a more difficult warehousing problem than one making tin cans. However, each and every company has some handling or storage problems. In many cases these problems require a great deal of perseverence and ingenuity to find the best solution.

About the Author

David W. Chase has served as a management consultant on warehousing and material handling to a number of large multi-plant companies. He has supervised the planning of new factories and warehouses, and the improvement, modernization, and expansion of existing factories and warehouses. He is a registered professional engineer. He is a member of the American Material Handling Society, and has served as Vice President and Secretary of the New York Chapter. He wrote a section of the Material Handling Handbook. He has conducted seminars, and taught courses on warehousing and material handling, and has given numerous speeches on these subjects to technical societies.

Outside vs Inside Storage

The type of handling and warehousing system which can be used varies from industry to industry. There is a large group of industries which have a major portion of their storage outdoors, such as the heavy steel processing companies, lumber companies, pipe manufacturers, and concrete block manufacturers. Another large group of industries manufactures products which are stored indoors. This includes companies whose products are packaged in cans or corrugated cases, or a combination of the two, such as paint manufacturers, canned goods manufacturers, packaged foods manufacturers, and a host of others.

Companies which choose indoor storage do so mainly for necessary protection to their products. Outdoor storage is cheaper than indoor storage. It does not require a building, and larger, faster handling equipment can be used.

In some cases, companies which use indoor storage are able to economize on their indoor storage facilities in areas where the weather is less severe. They may eliminate the side walls in their warehouse, or use lower cost construction. They might even use outdoor storage on a limited basis. For example, powdered chemicals and sugar may be shipped from the supplier to the user in large rubber bags, or large steel containers. These may be stored outdoors. Items packed in 55 gallon steel drums may be stored outdoors. Products packed in paper bags or corrugated cases may be covered with waterproof tarpaulins and stored outdoors, if necessary. Inflatable tents made of light weight, waterproof materials may

be used to provide low cost covered warehousing.

Many companies which use outdoor storage do so as an economy or emergency measure. They would choose indoor storage if it were feasible. The possibility or using outdoor storage on a limited basis, or otherwise, should not be overlooked.

Service Function, And Its Effect

The type of service a warehouse is to perform has an effect on the building design, the choice of handling equipment, and shipping and receiving facilities. A warehouse which is connected to a factory, (factory warehouse), may be called upon to store not only finished products from the factory, but also raw materials, packaging materials, in-process materials, and possibly a large group of miscellaneous materials and supplies.

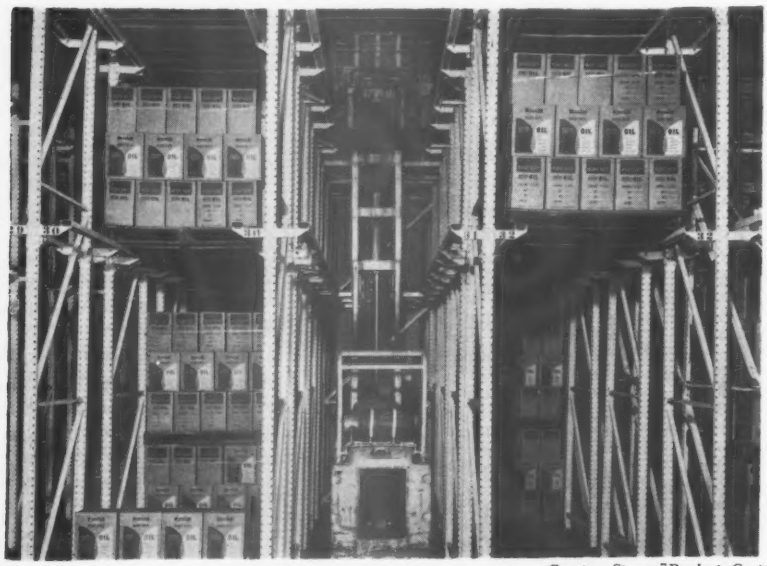
A distribution warehouse which is set off by itself completely independent of a factory, will be called upon to handle finished products only. The finished products may be from several plants.

Some companies use a factory warehouse also as a distribution warehouse. In this case, the warehouse might be called upon to handle all finished products from several factories, plus the raw materials, packaging materials, in-process and miscellaneous materials for the adjoining factory.

In general, the greater the number of separate or dissimilar products handled, the greater will be the variety of handling and storage methods required.

Column Spans

In the design of a warehouse it would be desirable to have no columns at all. Since this is usually impossible or impractical the next base thing is the longest possible distance between columns. For most warehouses 40 foot x 60 foot bays are about the largest which are economically feasible. Steel columns are generally favored over concrete colums because they are slimmer than concrete columns. Some companies are able to effect economy in building construction, and at the same time obtain long spans between columns, by the use of prefabricated steel buildings, or buildings which are made almost entirely out of treated wood.



Courtesy Storage Products Corp.

Drive-in Racks

Inside vs Outside Loading

Almost any warehouseman would prefer inside truck spots and rail tracks. In some parts of the country this is more necessary than in others. However, even in those parts of the country where inside car and truck facilities are highly desirable, many companies operate warehouses and factories without them. No doubt some money is saved in shipping and receiving with inside truck and car facilities, but it is difficult to exactly determine how much. In general, it might be said that if a company is in a strong, profitable position and wants the best, inside car and truck facilities should be provided. On the other hand, if minimum capital investment is necessary, outside car and truck facilities should be provided if it is possible to use them without ruining the product.

Floors

A great many warehouses are built with the floor at "car door height". This is about 48″ above grade for box cars. This is also approximately the height of trailer trucks.

When the floor of the warehouse is at car door height, the use of some kind of bridge device is desirable between the truck platform and the truck bed. It may be a simple steel plate, a portable dock board, or a permanently installed adjustable loading dock.

The use of adjustable loading docks for trucks has increased tremendously in the last five years. The cost has come down about half. Many different types are available—manual, mechanical, air operated, and hydraulic. A very popular type today is the mechanical type, the height of which is regulated by striker arms which contact the truck.

Truck bed heights, (exclusive of pick-up trucks), range from approximately 42″ to 60″. During loading and unloading, a truck may change bed height as much as 6″ due to spring and tire compression. In cases where it is desirable to run power trucks, or even hand trucks, into trailers during loading or unloading operations, adjustable loading docks speed the loading operation considerably.

Some companies install adjustable docks at some truck spots, and use portable units at others. They may also set some dock heights at 45″, others at 50″, others at 55″ to more closely match the bed heights of various trailers. This shortens the length of the adjustable or portable dock required, and thus narrows the loading aisle.

When identical trailer trucks are used at certain truck spots hydraulic rams may be installed which rise under the frame of the trailers. This lifts the trailer off its tires and springs, and maintains the trailer bed at the same height during the

entire loading or unloading operation.

Another device is a hydraulically operated ramp under the wheels of the trailer. This is the most expensive type of unit, and has the disadvantage of causing considerable slope to the bed of the trailer when the ramp must be extremely raised or depressed to accommodate a particular trailer.

A bridge of some type is also required between the loading dock and the floor of box cars. A number of types are available in steel, aluminum, and magnesium. Permanently installed, power operated units are also available. One portable unit is available which has retractable wheels, and handles which fold down out of the way. One man can roll it into position at cars or trucks.

Building a warehouse with the floor at car door height entails extra costs for construction. Some companies escape this extra cost by building their warehouse at grade level. They run flatbed trailer trucks right into the warehouse and load them from the side using a fork truck to place pallet loads of goods onto the open trailer. They also load rail cars by placing pallet loads into the door of the car with a fork truck.

A second method of loading is to put a ramp up to the car door or truck bed so fork trucks can run up the ramp and into the car or truck. The ramps may be permanently installed or portable. A number of portable units made of aluminum are available which can be moved into position by one or two men.

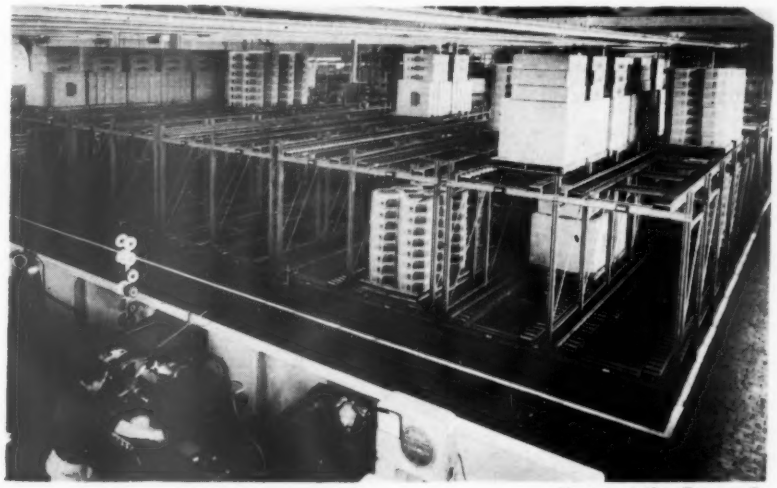
If there is insufficient space for a ramp, a hydraulic lift might be used. These are available either for permanent installation or for portable use.

Another method is to build a loading platform at car door or truck bed height. A fork truck operating on the grade level floor places pallet loads onto the loading platform. The pallet loads are then picked up by a second power truck operating on the platform, and are placed into the truck or car for loading.

Another method of operation from grade level floors is to provide depressed truck and rail car spots. This has the disadvantage of possible flooding in heavy rains, or filling with snow in the winter. The truck ramps which go down into the depressed truck spots may ice up in the winter and cause difficulty getting trucks in and out.

Ceiling Height

The ceiling height which should be provided in a warehouse is dependent on how high the product can be stacked without injury to the product, or excessive overloading of the floor. In some cases extra height is provided over and beyond that required for storage to provide space for overhead cranes, electrical, or other facilities, or to match the height of other buildings, or another part of the same building. From a cost standpoint, clear stacking heights which exceed 20 feet pyramid building costs.



Courtesy of Alvey-Ferguson Co.

Roller Racks

Aisle Width

The use of fork trucks and pallets is common in many warehouses. The type of fork trucks used has a substantial effect on the amount of floor space required. Counterbalanced trucks with 2,000 to 4,000 pounds capacity require aisles 10 to 12 feet wide. Outrigger trucks in the same capacity range require aisles only 6 to 8 feet wide.

A new type counterbalanced truck has now been developed which uses a new attachment called a "Stow" attachment to provide side loading. Another new counterbalanced truck uses a mast which rotates 90 degrees to provide side loading. Aisle widths of 6 feet or less can be used with these new counterbalanced trucks.

New type outrigger trucks have also been developed which walk sideways in a crablike fashion. This enables the use of slightly narrower aisles than with standard outrigger trucks.

These new narrow aisle trucks are outgrowths of side loader trucks which have been available for inside use for about five years.

Trucks which operate in narrow aisles are generally slower than those used in standard aisles. However, the slower speed is offset to some extent by shortened travel distances brought about by the narrower aisles. Many companies that used counterbalanced trucks and 10 to 12 foot aisles in initial operations have changed to outrigger trucks and 6 to 8 foot aisles to enable obtaining greater storage capacity without building more warehouse. In some cases they use counterbalanced and outrigger trucks in combination. Now that still narrower aisles are possible, some companies will adopt the new equipment which makes them possible.

Narrow aisles are especially desirable in warehouses where the inventory of each item is small, and the number of pallet stacks between aisles must be kept down to provide accessibility to each item. In cases of this kind there will frequently be a double row of pallet stacks, followed by an aisle; then another double row of pallet stacks; then another aisle, etc. In other words, there is an aisle for each two rows of pallet stacks.

If the aisles are 12 feet wide,

Courtesy Chicago Tramrail Corp.

Trak-Rak Overhead Stacker. Rider type units are available. Fully automatic operation is possible.

and the pallets 4 feet long, there will be a 12 foot aisle for each 8 feet of stock. The space in the warehouse for aisles will far exceed the space occupied by stock. By getting the aisles down to 6 or 8 feet or less, the total space required for aisles is substantially reduced.

Pallet Racks

In case where the inventory of individual items is only a few pallet loads, or where the pallet loads are unable to support the weight of other pallet loads stacked on top of them, pallet racks may be used. Three main types are available—tray type, drive-in, and roller.

The tray type are usually installed in a double row back to back, followed by an aisle, then another double row back to back and an aisle, etc. This provides accessibility to every pallet load, but requires considerable aisle space. It is most suitable to items with inventories ranging between one and four pallet loads.

Drive-in and roller type racks reduce aisle space requirements as compared to the tray type. They enable racked block storage. With the drive-in type, the power truck raises the pallet to the desired shelf height while still in the aisle. It then enters the rack to the desired depth, and sets the pallet load down on the shelf. The shelf consists of two longitudinal beams, one on each side, which support the pallets near the outside edges.

The roller type has shelves with rollers in them. The fork truck raises the pallet load to the desired shelf height in the aisle, and places all pallet loads into the shelves from the aisle. This saves fork truck time. It also enables first-in, first-out handling. Pallet loads may be placed into the rack from one aisle, and withdrawn from the next aisle.

Drive-in and roller type pallet racks are best suited to items with inventories of four to eight pallet loads. They do not provide accessibility to each and every pallet load, as do tray type pallet racks, but they reduce aisle space requirements, as compared to the tray type.

With pallet racks, extra ceiling height is required in the warehouse for the thickness of the trays and the clearance space needed between the tops of the pallet loads and the trays above them. Tray thicknesses normally range between 3″ and 6″. The clearance space is usually 4″ to 8″. When stacking four high in trays, an extra 2 to 3 feet of ceiling height is needed over and beyond what would be required without racks. Extra lifting height is also required of the fork truck used to store pallets in the racks.

Power Truck Accessories

The fork truck and pallet system is still in heavy use, but increasing attention is being devoted to special power truck attachments which enable eliminating the need for pallets. For example, 55-gallon drums may be handled with special drum clamps. Household appliances, such as stoves and refrigerators, are handled using crate clamps, package fingers, and suction cups. Unit loads of package goods are handled with clamps or Pul-Paks. In some cases the product is stored on pallets, but is removed from the pallet by the power truck for placing directly into the rail car or truck.

Gas vs Electric Trucks

Electric trucks are not necessarily essential for inside warehousing. Many gasoline or liquified petroleum gas, (LPG), counterbalanced trucks are about half the cost of equivalent electric counterbalanced trucks including the cost of the batteries and chargers.

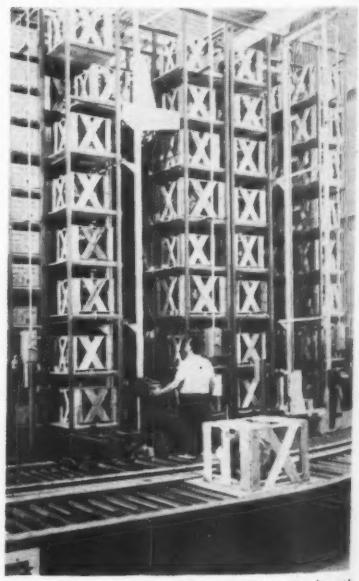
When gasoline or LPG trucks are used, adequate ventilation should be provided. Exhaust fans may be installed in the roof of the warehouse. The fans need not be operated at all times—only when the air becomes heavy. Operation of the fans should be kept to a minimum, expecially in the winter, because of heat losses.

When using gasoline trucks the carburetors must be set properly, otherwise the trucks will smoke. This leads to employee complaints. It also causes higher fuel usage, and greater use of the fans. The CO content of the air may be checked with a CO_2 tester when complaints arise, or more frequently if desired.

Eliminating Fork Trucks

Some warehouses have reduced or eliminated the use of fork trucks by using overhead stackers, towveyor systems, tractor trailer trains, or conveyors. Overhead stackers ride on crane rails above the storage area. They have an inverted mast with a fork carriage on it. The mast is similar to the ones used on fork trucks except that it is suspended vertically downward from an overhead crane.

Pallets and pallet racks are generally used in connection with overhead stackers. Narrow aisles are used. Automatic warehousing is



Courtesy Triax Equipment

Retriever. Operation of the unit shown is controlled by push buttons.

possible with overhead stackers.

A new piece of equipment called a Retriever is now available. It also enables narrow aisles and automated storage.

Towveyor systems consist of 4-wheel non-powered trucks which are pulled by cable conveyors. The cable may be installed in the floor or overhead. The trucks are disengaged from the cable conveyor and pushed manually into adjacent storage for loading. They are then hooked to the cable and pulled to the shipping department for loading into trucks or rail cars.

The tractor-trailer system is similar to the towveyor system except that tractors are used to pull the 4-wheel trucks to destination after loading. Tractors are available which automatically follow a colored tape on the floor, and do not require a tractor operator.

In many cases, fort trucks are used in combination with a towveyor or tractor-trailer system. The fork truck enters the block storage area, brings a pallet load out, and places it onto the 4-wheel trucks for delivery to the shipping department by the towveyor or tractor.

When conveyors are used, individual packages may be loaded onto the conveyor for delivery to the shipping department, or a conveyor large enough for entire pallet loads may be used.

Each of these systems—overhead stackers, Retrievers, towveyors, tractor-trailer trains, and conveyors—are used in an attempt to reduce labor. A careful study is necessary before choosing the system to make sure the labor savings, or other benefits, justify the investment. The first cost is usually higher than for fork trucks.

Choosing the Pallet Size

In choosing a pallet size or unit load size, the most important consideration is whether palletized or unitized shipments are to be made now, or in the future. For example, 2-way pallets 48″ long x 40″ wide, and 32″ long x 40″ wide fit into trailer trucks. Pallets 40″ long x 32″ wide, 40″ long x 48″ wide, and 48″ x 48″ fit into rail cars. If it is desired to obtain pallets which fit both trucks and rail cars, 4-way pallets 48″ x 40″ or 32″ x 40″ are necessary. A 4-way pallet may be picked up from all four sides by a fork truck.

The pallet sizes mentioned above are standard pallet sizes. In some instances, where no palletized shipment is ever intended, it may be found that an odd sized pallet will provide maximum economy in storage and handling. For example, a 46″ x 54″ pallet might enable storing 30% more product in the same storage space than one of the standard sizes. It will also enable a 30% reduction in handling. This sometimes leads to two or even three different pallet sizes in the same warehouse. The standard size will be used for products to be shipped palletized, and the off-standard size for items which are not shipped palletized.

Courtesy Mathews Conveyor Co.

Console operated order selection.

Palletizing

In many case goods warehouses, the product is palletized in the warehouse. For example, in a factory warehouse the product may pass through automatic case sealers located at the ends of the production lines. Conveyors bring the cases down into the warehouse for palletizing.

Manual palletizing can be speeded by the proper use of gravity type roller or skate wheel conveyors about 10 feet long at each palletizing station. One 10 foot long roller conveyor is needed for loaded pallets, and another parallel to it for empty pallets. This enables the pallet loading crew to roll a loaded pallet out of the way, and replace it with an empty without assistance from a fork truck. It speeds the manual palletizing operation; and also minimizes the number of fork trucks required to service the palletizing station.

Manual palletizing of case goods can be completely eliminated by the use of automatic palletizing machines.

In palletizing bagged goods, improved stacking can be obtained by using a bag flattener before palletizing. The pallet loads are more uniform, they stack better, and they have less overall height for the same number of bags per pallet so that considerably more product can be stored in the same warehouse space. Automatic palletizers are also available for bagged goods.

Single Story vs Multi-Story

The trend in recent years has been toward single floor warehouses. This eliminates extra space for stairways and elevator shafts, enables better supervision and control, greater efficiency, and less manpower. However, in some cases it is necessary to build new warehouses multi-story, and of course there are many existing multi-story warehouses which are being operated.

Some of the disadvantages of multi-floor warehouses can be overcome by the proper use of conveyors, automatic freight elevators, or automatic pallet elevators. The use of this equipment eliminates lost time by power trucks waiting for the elevator, or riding up and down between floors with the loads, or eliminates the extra labor which is necessary to load, unload and operate manually operated elev-

ators if power truck delays are to be avoided.

In an existing warehouse which has manually operated freight elevators which would be expensive to replace, it is sometimes possible to add roller or skate wheel conveyors to the floor of the elevator, and to the floors of the warehouse just outside the elevator. This enables the elevator operator to load and unload the elevator without the help of a power truck. It eliminates delay for power trucks waiting for the elevator, or riding up and down between floors with the loads, and enables obtaining maximum utilization from an elevator which would otherwise be unable to keep up with the work load.

Milton Can Co. uses dolly system to deliver empty tin cans to paint manufacturers.

Order Selection

A major problem in many warehouses is order selection. This is especially true where orders call for less than pallet load quantities, and even more so where the orders call for less than a full case of any one item.

One method of filling an order is for the order selectors to pass through the entire warehouse and pick the items for each order from block storage. Another method is to provide a separate order selection area with only one pallet load of each item on the pick line. This shortens the travel distance for the order selectors in filling each order. If the pallet loads are racked more than one high, the order selection line is shortened still more.

A further shortening of the order selection line is possible by the use of shelving or order selection racks. This enables shortening the space for each item down to the width required by only one package of that item. Multiple tier order selection racks enable several items, one above the other. This provides further shortening of the pick line.

A wide variety of equipment is available for order selection operations. For picking direct from block storage not too high for a man to reach the product, or a pick line of pallets only one high, 4-wheel or 6-wheel hand trucks are frequently used. Other possibilities include manually pulled pallet or skid lift trucks, semi-live skids, a tractor pulling one or more trailers, or a fork truck carrying a pallet or skid. In any case the pick operator, (order selector), moves down the pick line, removes items from the pallet loads, and places them onto his vehicle, and then takes the completed order to the shipping department, or places it on a conveyor or towveyor line which takes it to the shipping department.

If the items to be picked are stored higher than the operator can reach, he will require an order selection hand truck with a ladder on one end of it, or a fork truck to bring the top pallet loads down to floor level, or a powered order selection truck to raise himself to that height. Remote control trucks are available for this latter purpose which enable the operator to stand on a platform over the forks so he can operate the truck in addition to doing the picking. This eliminates the need for a separate man to operate the truck.

Picking from shelving or order selection racks may be accomplished in the same manner as described above for block storage—by pushing, pulling, driving, or in some way controlling the movement of a wheeled truck along the pick line. As a substitute for the truck it is possible to use a conveyor. The items for an order may by picked off the shelves or order selection racks and placed into a basket. The basket is then placed on the conveyor for delivery to packing and shipping. The same order selection operator may service the entire pick line, or separate operators may be assigned to sections of the pick line to reduce walking.

A further refinement on order selection is automatic picking. The items to be picked are placed in slide, roller or powered racks. An operator at a central console pushes buttons, and the racks automatically discharge packages as required onto the conveyor belt for delivery to packing and shipping.

If a magnetic conveyor belt is used, it is not necessary for the belt to clear before starting to punch out another order. A magnetic impulse may be induced into the conveyor belt at the time each package is dropped onto the belt. As the packages for a given order reach the packing section they are automatically diverted to one packing station. The packages for another order are automatically diverted to another packing station, etc.

A still further refinement on console operated order selection is a console which is operated automatically by punched cards or tape. This eliminates the console operator. The punched cards or tape are prepared by the machine accounting section.

In many cases where order selection racks or shelving are provided, they cannot be used to fill all orders. Entire orders, or parts of some orders will call for large

(Turn to page 161)

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CONVEYORS

By

Robert Fritsche

CONVEYORS are a basic tool in material handling. The movement of products in any continuous flow industry is dependent upon conveyors of one type or another. Conveyor equipment is available in many different categories from the simple Roller Gravity type to the intricate electronic controlled Power Conveyor system. Primarily, conveyors can be either of the gravity or power type. Gravity conveyors are the simplest and include the skate wheel or roller style. Power Conveyors in the simplest classification would include Belt Conveyor, Chain Conveyor, and other miscellaneous power units.

About the Author

Robert Fritsche is presently employed as Sales Engineer with Sanford Distributors of New York, specializing in material handling.

From 1949-1956 Mr. Fritsche was connected with the Oliver Corp., in various engineering and sales capacities. Prior to joining Sanford Distributors, he was employed by the Speedways Conveyors, Inc. as a Conveyor Sales Engineer. He presently acts as National Account Representative for Speedways Conveyors.

Mr. Fritsche received his Bachelor of Science degree in Industrial Engineering from Ohio State University in 1949. He is a member of the American Material Handling Society and the American Institute of Industrial Engineers.

Gravity Conveyor

Gravity Conveyor is constructed of two or more rails that support axels which in turn support freely rotating skate wheels or pipe rollers. The wheels or rollers provide a conveying surface which will adequately handle most containers or articles having a smooth or firm surface in contact with the rollers.

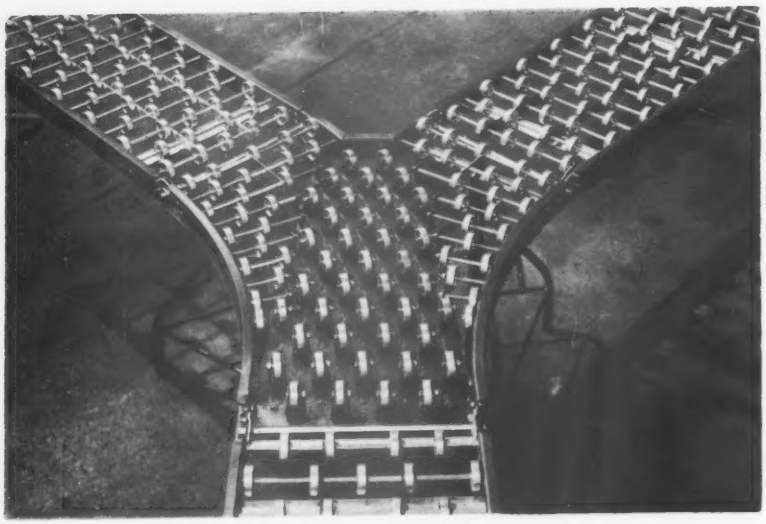
Gravity conveyors can be used in level lines where the article to be conveyed is manually moved or the sections can be set on a pitch where the articles are conveyed by the force of gravity. Extensive systems can be designed by combining Gravity and Power Conveyors.

Skate Wheel Conveyors are constructed of staggered rows of ball bearing type wheels. The wheel pattern is specified in wheels per foot. Standard units are available in ten foot lengths and various widths, with 12″ and 18″ wide being the most popular. Both steel and aluminum construction are used in these units. In addition to straight section, most manufacturers provide curves, gates, switches and other special sections which might be required. These units can be used in permanent or portable installation. Advantages of this type of conveyor are low initial cost, low upkeep, light weight and availability. Cardboard cartons or any smooth surfaced object can be handled on these conveyors. Special wheel pattern can be provided to carry multiwall bags or cylindrical objects.

Due to the general construction of this type of unit, they are classified as light weight conveyors and will support an average of 75 lbs. per foot depending upon the condition and surface of the container.

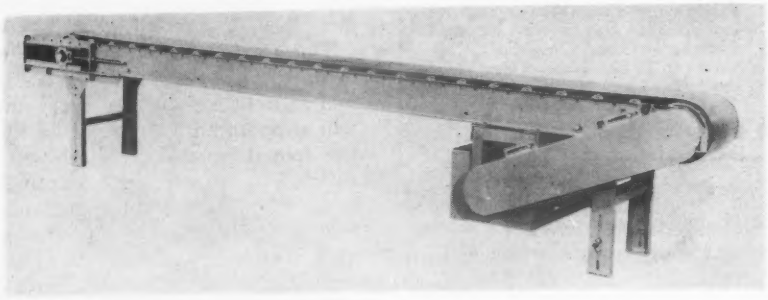
An adaptation of this Skatewheel Conveyor is the gravity storage rack, which is a series of rails or sections mounted on a rack with a gravity pitch to one end. This provides a live storage area with a greater amount of workable space than can be obtained in conventional racks. It also provides for automatic rotation of merchandise on a first-in-first-out basis. By using standard sections it is possible to construct a rack to meet most any requirement.

Roller Conveyors are constructed



Skate Wheel Switch Conveyor

Gravity Roller Conveyor



Roller Bed Belt Conveyor

of parallel pipe type rollers with plain or anti-friction bearings mounted on angle or channel type rails. This type of conveyor is in general use in most industries. Steel is the most common roller material, but other metals as well as wood and plastics are found in special applications. Roller sizes vary from less than one inch in diameter to six inches and above. Most manufacturers can provide rollers in any desired length and in many carrying capacities. The capacity of the roller is determined by the type of load, bearing, roller length, roller thickness, roller diameter and axle. The spacing between rollers is important to provide smooth movement of a container. It is general practice to have at least three rollers under the container at all times. Curves, gates, switches, and special sections are available in roller conveyor and most systems are designed to fit the specific requirements.

Power Conveyors

Power Belt Conveyors are constructed of flat steel or roller beds with endless belts or chains running over pulleys at each end of the bed. Most of these units are powered by electric motors, but in some cases gasoline engines are used. Belts can be of various type, depending upon the application—some of these types are plain cotton duck, impregnated duck, rubber covered duck, and steel mesh. Belts come in any number of weights, sizes and material construction and can be applied to most any carrying problem.

The basic Belt Conveyor is the level straight line unit used to move articles from one point to another. These units are made in any number of sizes and carrying capacities. For example; a 1″ wide x 6″ long belt carrying pills between machine operators, to a 48″ wide x 500 foot long belt carrying refrigerators from a plant to a warehouse. There are many specific types of Power Belt Conveyors, but all are variations of the basic unit.

Table Top Belt Conveyors provide a means of moving material between work stations or past operators working directly on the belt. These are usually slider bed type conveyors with 2 or 3 ply cotton belts. Belt speeds can be varied by means of a variable speed drive to allow for changes in operation. The majority of manufacturers now provide these units in standard lengths and widths which can be adapted to most any requirement. The addition of casters to the supports will make these units portable.

Inclined Belt Conveyors are used to lift containers between floors or over obstructions. On these units a rough top or non-skid belt is used. In most cases these belts will carry a regular shaped object on a 30° angle without slippage. In extreme cases cleats

can be placed on the belt to provide a steeper carrying angle. Reversing drives are used on these units to allow for both up and down movement. Power feed sections, nosed over delivery sections, and guard rails are some of the accessories available.

Booster Belt Conveyors are small inclined belts that are used in gravity flow systems to regain the vertical distance that has been lost in the flow system. These units generally have tail feeders, and nosed over deliveries for smoother movement.

Portable Booster Belts are used in all types of applications. They can be used in a permanent line or can be used for operations, such as truck loading or stacking. The conveyor section is mounted on an undercarriage that has wheels or casters. The supports can be manually or mechanically adjustable.

Live Roller Conveyors are basically a gravity roller conveyor with a means of rotating the rollers by power. This rotation can be accomplished by roller chain and sprockets attached to the roller or a belt bearing against the underside of the roller. The advantage of the Live Roller Conveyor is that containers can be held back while the conveyor is still moving or that articles can be easily transferred on or off of the conveyor.

Troughed Belt Conveyors are endless belts carried on a troughing idler. These idlers form the carrying belt into a trough and increase the carrying capacity of the belt for bulk or granular type of material. Plain belts can be used for horizontal carrying and for slight inclines. To carry this material at an angle, cleats or flights are added to the belt. Troughed belts find their biggest application in construction projects, chemical plants and in bulk handling. In fixed installation, belts like these can be miles long. By mounting the Conveyor on a wheeled support you obtain the familiar coal or sand handling type of conveyor.

Chain Conveyors are power driven conveyors with one or more bands of endless chain operating on tracks or guide rails. The load is placed on the moving chain and conveyed toward the head end of the Conveyor. Special chains are available with friction reducing rollers for carrying heavy loads such as barrels or timbers.

Drag Chain Conveyors are usually a single strand chain conveyor which slides in the base of a trough. The links of the chain are so designed as to pick up small quantities of bulk or granular material and drag it along until it is dis-

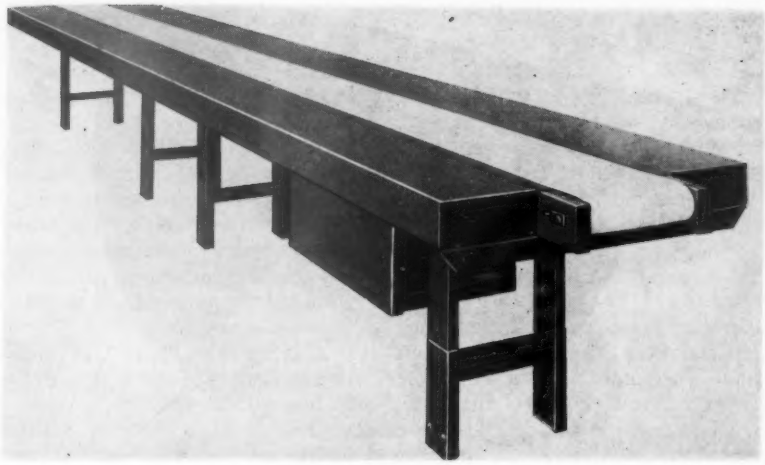
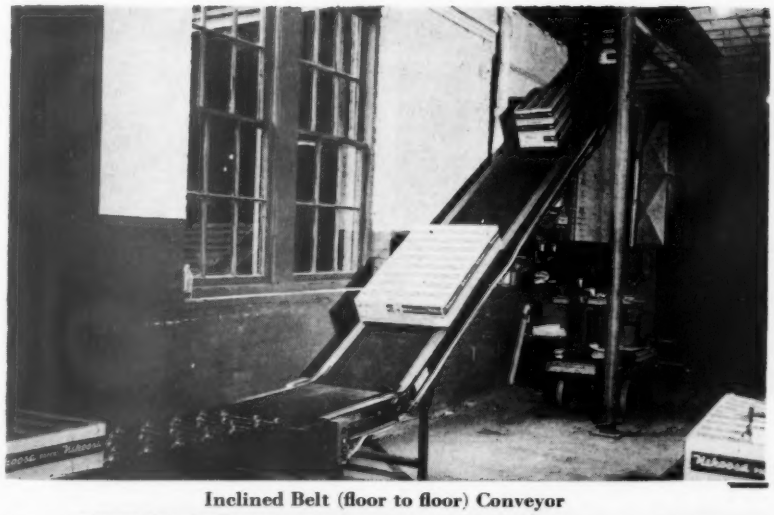
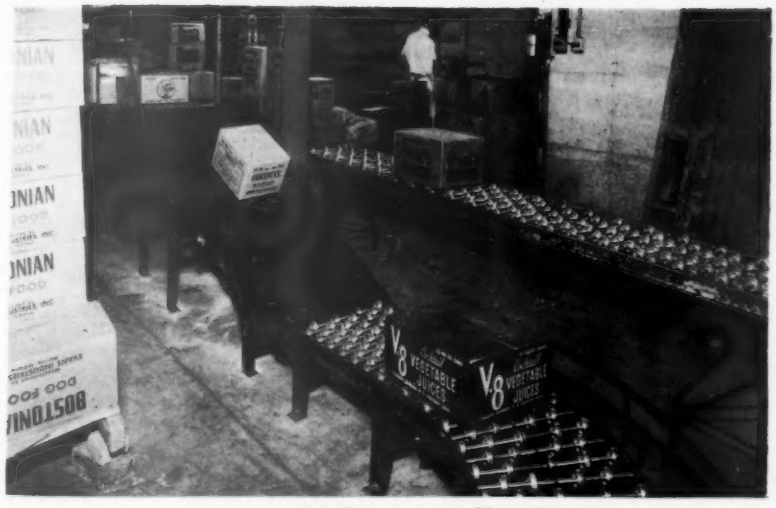


Table Belt Conveyor



Inclined Belt (floor to floor) Conveyor

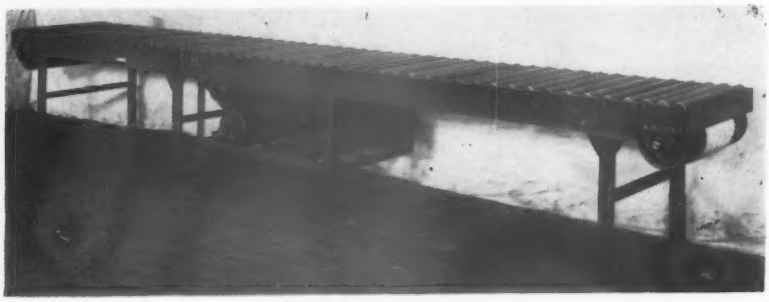


Permanent Belt Booster with Skate Wheel

charged over the head pulley.

Push Bar Conveyors are constructed of double strands of chain conveyors with a bar attached to the chain. The bar acts as a cleat to engage the load, and push it along the bed of the Conveyor. These machines are used primarily for elevating bale or box type loads. Special adaptation of this unit can be used for lifting box or hand trucks.

Slat Conveyors are similar to push bar conveyors in construction, but have wooden slats attached across the chain which carry the load. On inclined application, cleats are added to prevent containers from sliding. These units are designed for heavy loads or installations where there is considerable impact.



Live Roller Conveyor

Apron Conveyors are power operated conveyors constructed with metal cross member aprons supported between two strands of chain. The aprons overlap or interlock preventing loose materials from falling between them. Aprons are also available with overlapping side members which provide a continuing trough type unit for bulk handling.

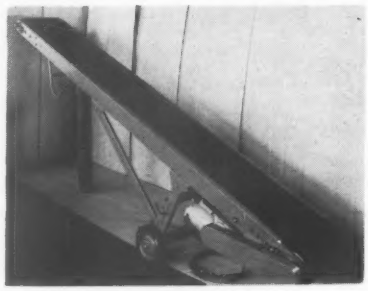
Flight Chain Conveyors are single or double strand chain conveyors to which are mounted flights or pushers that extend down into a trough. The flights are equipped with rollers or wearing blocks which ride rails on the sides and bottom of the trough. Materials are dragged through the trough by the flights and discharged over the head pulley.

Bucket Conveyors are double strand chain conveyors with buckets mounted between the chains. Buckets can be fixed or pivoted type, depending upon the loading and unloading application.

Table Top Chain Conveyors are single strand chain conveyors that slide on angle or channel frame members. The table top chain is basically a roller chain with flat steel or nylon plates attached to the chain. There is also another type of table top chain which has no chain as such, but is made of hinge type plates connected together with a pin. The drive sprockets are of sufficient pitch to engage the hinge pins and thus transmit the power from the shaft to the chain.

This type of chain is available in standard widths of 3½ to 7½ inches which limits the size of containers that can be satisfactorily conveyed. For the most part these units are used in horizontal applications only.

The most prevelant use of table top chain is in industries concerned with filling small containers. These conveyors are usually built into filling and packaging machines and are also used to provide movement of containers between operations.



Portable Booster

Guard rails are used on these units to keep the containers on the chain and turn tables are supplied to obtain a smooth transfer from one conveyor to another. Extensive systems of this type are found in the paint, drug and food industries.

Trolley Chain Conveyors operate on an endless I beam or similar type track on which trolleys are assembled. Power is transmitted to the chain from sprocket or caterpillar type driven units that engage the links of the chain.

The most frequent use of this type of unit is in the overhead trolley conveyor. Loads are hung on trolleys which are suspended from the flanges of the carrying beam. The chain between these trolleys then serves only to propel and space the trolleys along the overhead rail. Trolley conveyors can also be mounted in or on the floor and be used as drag type conveyors.

Overhead Conveyors are used in horizontal or inclined application. Fixtures can be attached to the trolleys to hold most any type of part or container. These units are particularly suited to handling of loads through process and assembly operations.

There are a number of other types of trolley conveyors. While they all use the basic trolley load support, the trolley can be suspended from many types of rail. Some of these being angles, pipes and formed sections.

In place of chain some designs transmit the power to the trolley by cables or formed chain type devices.

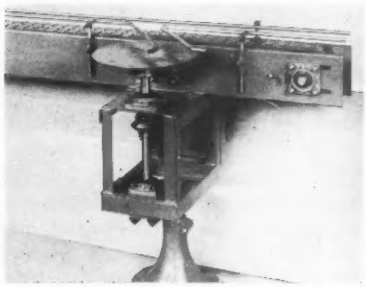


Table Top Chain with Turntable

Load capacities of these units vary from 2 pounds to over 500 pounds per trolley, and drives can be designed of sufficient size to power conveyors of thousands of feet in length.

One of the more recent developments of the use of Overhead Chain is the power and free system. This is primarily a Trolley Conveyor with the trolley acting as the pusher of a parallel trolley conveyor. The second unit consists of only a trolley and a rail with no chain. The load is hung on the

(*Turn to page 160*)

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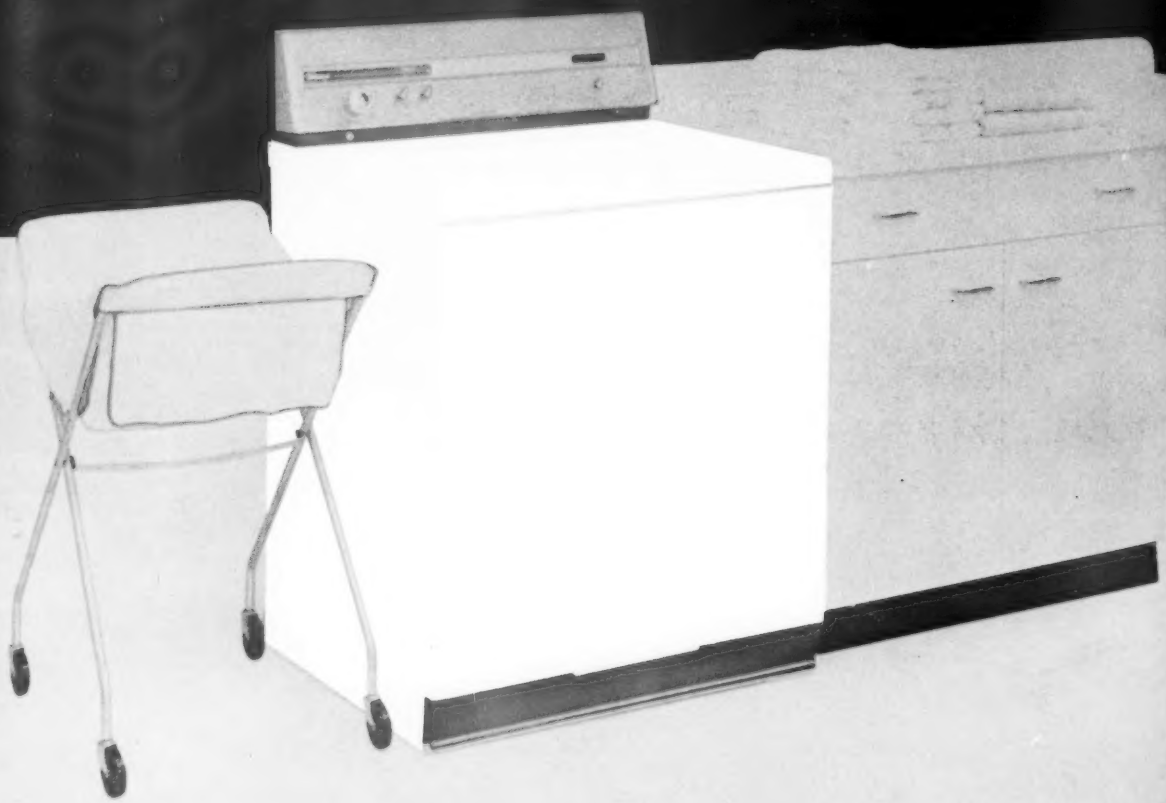

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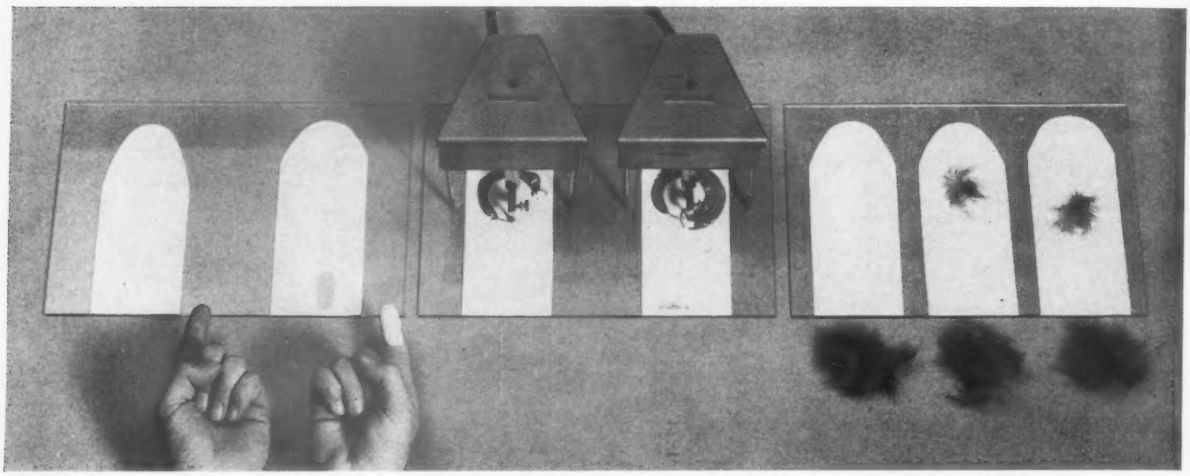

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DRY TIME RECORD – 24 hour cycle ... Left Drawdown – Safflower – IPA base ... Right Drawdown – Linseed – IPA base

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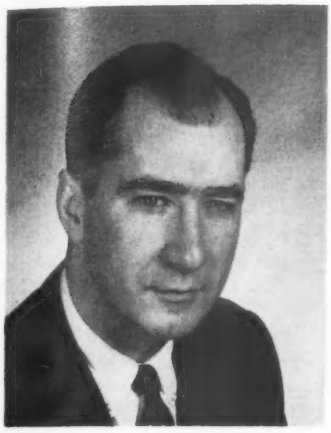


POWERED FLOOR EQUIPMENT

By

Frank B. Chester

THE terms "Lift Truck", "Fork Truck", "Stacker", etc., have been used indiscriminately over the years to the point where today's prospective user does not have a clear picture of what he wants or even what is available.

The primary purpose of this article is to impart to the present and prospective user enough basic information to enable him to select equipment with a good degree of certainty. The reader should, after reading the article at least once, be able to ask enough intelligent, pertinent questions of an equipment salesman to "separate the men from the boys", so to speak. This accomplished, he should then be on the road to selecting the right type of equipment. As to which make is the best for him, is entirely a personal matter—mixed and influenced with the abilities of the salesman.

It is important to concede that unless an individual is intimately involved, on a fairly constant basis, with material handling equipment a good understanding of each type and its application remains elusive.

In as much as *Lift Trucks* take up the far greater portion of the Powered Floor Equipment category of Material Handling Equipment, we will devote most of the detail and space to them.

Section I will be devoted to a glossary of terms and a brief description of the important components of lift trucks.

In Section II we will define the types of Powered Floor Equipment and tabulate the many different types of lift trucks.

Section III will discuss briefly Accessories, Attachments and Safety Equipment.

About the Author

Frank B. Chester attended M.I.T. and was graduated from the U. S. Merchant Marine Academy in 1948. He holds a lieutenant's commission in the U. S. Navy.

From 1953-1956, Mr. Chester was connected with Hyster Company, specializing in fork truck sales. He is presently manager of New York National Accounts for Atlantic and Gulf Equipment Corp., New York City. He holds a patent on hydraulic clamp pre-stressed arms for palletless handling.

Mr. Chester is a member of the New York Chapter of the American Material Handling Society. He served on the board of directors of this chapter and was its former program chairman. He is assistant instructor in materials handling for Traffic Manager Institute.

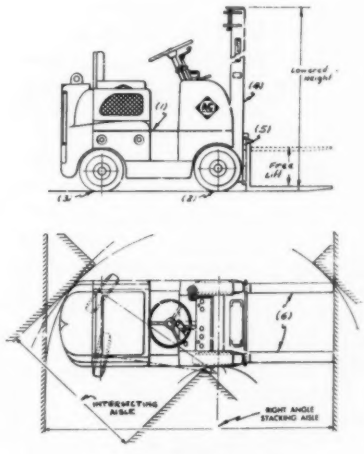
SECTION I

Glossary of Terms

(1) Chassis
Base Unit
Body

(2) Drive Wheels
Traction Wheels
Front Wheels

(3) Steer Wheels
Rear Wheels



Schematic Diagram

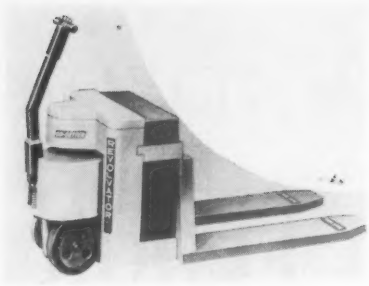


Fig. 1 – Type 1

(4) Upright
Mast
Vertical Channels
Telescoping Mast

(5) Carriage
Apron
Fork Carrier

(6) Forks
Blades
Chisels
Arms

(7) Lowered Height
Over-all Lowered Height
Collapsed Height

(8) Free-Lift

Masts and Lift Heights

The majority of masts today are actuated by a hydraulic piston and are either non-telescoping or telescoping. Very few masts are non-telescoping.

Types—In the telescoping group there are:

(1) *Standard Mast* (simplex cylinder)—most popular.

(2) *High Free-Lift Mast* (duplex cylinder)—accomplishes full free lift with same lowered and lift height as (1).

(3) *Triple Lift Mast*—recently developed to attain very high lifts and relatively low collapsed heights.

Within each of the three types each manufacturer normally offers three standard sizes. Therefore, there are nine standards to select from. It is advisable to stick to these standards, if possible, to avoid extra cost and extended delivery. In addition, it enhances trade-in value. But, if a special lift height is necessary, masts are available in two-inch increments.

There are four important dimensions of a mast; *lift*, *lowered*, *extended* and *free-lift*. *Lift* is the distance the hydraulic cylinder will actually move the forks or platform. *Lowered or collapsed height* is the height of the mast with the forks down. It is an important consideration with regard to door and overhead clearances within the operating area. *Extended height* is the highest point of the mast *assembly* (usually the carriage) when fully extended. Its importance comes into play where ceiling obstructions or fire sprinklers, and the like, have to be cleared in high stacking. Lastly, *free-lift* is the distance the forks can be raised from the ground before the inner mast assembly starts to protrude from the outer mast (i.e., starts to exceed *lowered height*). On a standard type mast this is approximately 12″ to 20″. On high free-lift type masts it is about 40 percent of the lift height.

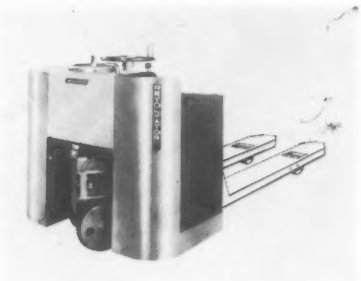


Fig. 2 – Type 2

Forks and Fork Lengths

Types—Standard pallet; *fully tapered and polished* for handling special loads without pallets (i.e., bales, crates, etc.); *bayonet* (round) for handling special paper sling pallets; *block* (square) for handling cement blocks; plus other highly specialized types of forks.

Fork Lengths—Standard available lengths in six-inch increments from 30″ to 48″. Longer lengths as non-standards also in six-inch increments.

Pallet manufacturers recommend fork lengths two-inches shorter than pallet for maximum pallet life.

Fork extensions available for occasional jobs of handling odd size goods or pallets.

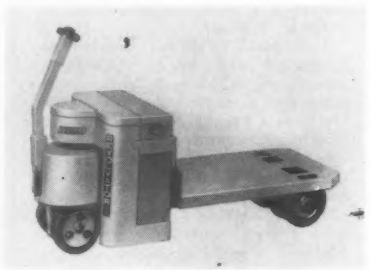


Fig. 3 – Type 3

Aisle Widths

Right angle stacking is that minimum aisle width required for a lift truck to perform a 90 degree turn within the aisle.

Intersecting is that minimum width required of two perpendicular aisles which will allow a lift truck to turn from one into the other.

SECTION II

The first broad classification divides Powered Floor Equipment into three categories:

Lift Trucks
Tow Trucks
Platform Trucks

Lift Trucks

By far the largest portion of Powered Floor Equipment is lift trucks, which also encompass the greatest variety of types.

Definition: —A *Lift Truck* is called a lift truck simply because it does just that. It lifts a load off the ground in order to make the load mobile.

How much (i.e., how high) it lifts, and by what means (i.e., principle) distinguishes the many distinct types from each other.

Basic Characteristics—

There are four (4) basic characteristics of lift trucks as follows:

A. Lift
B. Operator Position
C. Principle of Carry
D. Principle of Load Support

A. *LIFT*

(1) Low lift.
(2) High lift - (a) non-tilting
(b) tilting

Definition: — Much confusion has evolved in the usage of the term *Lift*. It is commonly used to describe *maximum fork* (or platform) *height* which is a separate and distinct dimension.

Lift is the actual distance of vertical travel of the forks (or platform). It refers to the distance measured from the same relative point when in the fully lowered and fully raised position (i.e., fork face to fork face, or fork bottom to fork bottom)

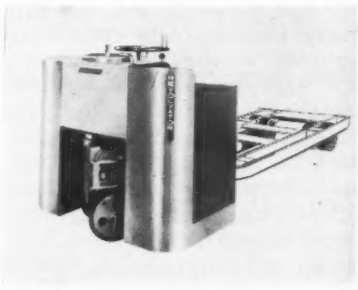


Fig. 4 – Type 4

in any case the measurement will be the same since the hydraulic mechanism has just so much travel and no more.

Maximum Fork (or Platform) Height—The actual distance of vertical travel *always* measured from the ground to the fork (or platform) upper face when fully raised.

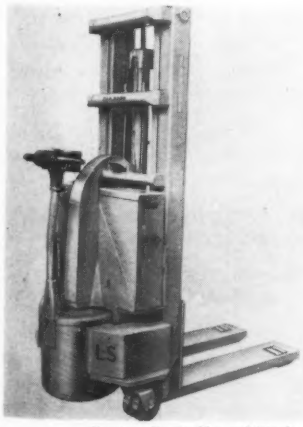
(*Note:* This difference between lift and maximum height is only of major importance in the *low lift type*, which will become evident later in the article.)

(1) *Low Lift*—From 1″ to 6″ of Lift. This type of lift does not require an actual mast (or upright) structure but is accomplished by articulated wheels hydraulically actuated under the load. The singular function of this *low lift* is to get the load off the ground in order to put it on wheels and thereby make it mobile with minimum frictional resistance to travel.

(2) *High Lift*—From 6″ to 28 feet, approximately. (Maximum lift determined by type of truck, capacity, operating conditions, etc.) In order to obtain this *high lift* a vertical upright, or channel structure, must be employed to contain and guide the load to these greater heights. Usually a hydraulic piston and chain arrangement is used. Here, the purpose is not only to make the load *mobile* but also *stackable* (i.e., one load on top of the other). A *high lift truck* is often referred to as a "stacker".

(a) *Non-Tilting*—The vertical upright is fixed to the truck frame permanently at right angles to the floor. This, of course, restricts operations to good, concrete, level (i.e., minimum ramps), floors, since any cocking of the truck will also cock the load.

(b) *Tilting*—The vertical upright can be leaned forward and backward independent of the truck chassis. This is usually accomplished hydraulically and usually the backward tilt exceeds the forward tilt for stability purposes, as well as cradling the load when traveling.



Courtesy Lewis Shepard Products, Inc.

Fig. 5 – Type 5

B. OPERATION POSITION

(1) Walkie.
(2) Rider (a) stand-up
(b) sit down

(1) *Walkie*—Here the truck is guided by the driver who walks along with the truck. The truck is not designed to carry the operator. All controls are mounted in the wagon type handle usually allowing lifting, tilting (if any) and travel motions to be operated with one hand.

(2) *Rider*—(a) Stand-up; (b) Sit down. In both cases the truck is designed for, and provides, a compartment for an operator to ride *with* the truck. All controls are located in the driver compartment.

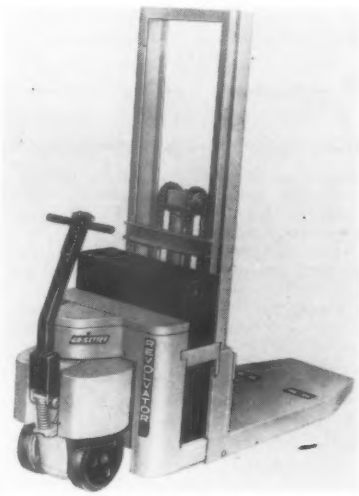


Fig. 6 – Type 6

C. PRINCIPLE OF CARRY

(1) *Burden**
(a) "Raise and roll"*
(b) Outrigger
(2) *Counter-balanced*

(1) *Burden*

(a) "Raise and roll"—The load is raised on, supported on, and rolled on the same basic member. The rolling is accomplished by articulated hydraulically activated wheels or rollers.

"Raise and roll" units apply to low lifts only.

(b) Outrigger—The load is raised on, and supported on, forks or a platform, but the load *rolls* on separate arms (or outriggers), which may or may not "straddle" the load, and contain fixed mounted wheels. Outrigger units apply to *high lifts* only.

(Note: Neither (a) or (b) are even of the counter-balanced principle since it would only duplicate the effort.)

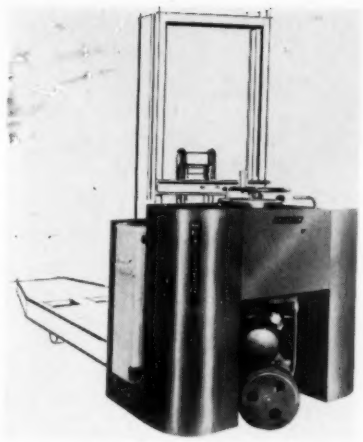


Fig. 7 – Type 7

(2) *Counter-balanced*

Here the load is carried by the "see-saw" or "teeter-totter" principle. The heavier the counterbalance weight and the further its distance from the fulcrum (in this case the front axle) the more the truck can pick up with its forks.

(Note: All units built with this principle are always of the fork-type since the unobstructed forks can pick up either pallet or skids.)

D. LOAD SUPPORT METHOD

(1) Forks (Pallet)
(2) Platform (Skid)

(1) *Forks* are designed to pick up and/or raise, plus carry a pallet. A pallet type can in many cases pick up skids too. The reverse, however, does not hold true.

(2) A *Platform* is designed to pick up and/or raise, plus carry a skid only. Cannot pick up a pallet.

Tabulating these four basic characteristics and their subdivisions into types of standard available trucks, see Table I.

Tow Trucks—The important characteristics of a tow truck are:

(A) Type of Drive
(B) Drawbar Pull
(C) Source of Power
(D) Type of Tires

*For lack of established terminology, "burden" and "raise and roll" are used as the most descriptive terms the author could devise.

	TYPES	See figure	POWERED DRIVE/STEER WHEEL (See Note 1 below)											Normal Capacity Range* in pounds
			(A) LIFT			(B) OPERATOR POSITION			(C) PRINCIPLE OF CARRY			(D) METHOD OF SUPPORT		
				High			Rider		Burden					
			Low	non-tilting	tilting	Walkie	stand-up	sit-down	raise and roll	out-rigger	Counter-balanced	Forks (Pallet)	Platform (skid)	
GROUP I	1	1	×			×			×			×		4000-6000
	2	2	×				×		×			×		4000-6000
	3	3	×			×			×				×	4000-6000
	4	4	×				×		×				×	4000-6000
	5	5		×		×				×		×		2000-4000
	6	6		×		×				×			×	2000-4000
	7	7		×			×			×			×	3000-4000
	8	8		×		×				×		×		2000-4000
	9	9		×			×			×		×		2000-4000
	10	10		×		×					×	×		1000-2000
	11	11			×	×					×	×		1000-3000
	12	12			×		×				×	×		1000-3000
	AUTOMOTIVE POWER TRAIN (See Note 5 below)													
GROUP II	13	13			×			×			×	×		2000-40,000
	14	14			×		×				×	×		2000-40,000

* at 24" load center.

Table I. Tabulating standard trucks into four basic characteristics and their subdivisions.

NOTES

GROUP I—(1) A distinguishing feature of this group is that the Drive Motor is always directly coupled as a "package" with the Drive wheel which is also the steer wheel. Another way of putting it is that the motor and drive/steer wheel are moved integrally as a unit. Inherently, by design, the power range of this type of drive is limited primarily because the entire weighty package is handled directly by the operator and weight becomes a drawback.

(2) This group is electrically powered with very few exceptions. The most common standard alternate is the combination gas/electric power package usually referred to as "Ready-Power". This unit is made up of a small gasoline or LP gas engine driving an electric generator/motor set. The obvious purpose here being to eliminate the necessity of battery charging.

(3) Only solid type, small (relatively speaking) tires are used on this group. This precludes use on anything but good concrete surfaces. Outside yard use is almost impossible unless it is well paved and weather conditions are good.

(4) The non-tilting characteristic is found only in this group. This, of course, ties in with the fact that they are best suited to good concrete surfaces.

GROUP II—(5) This group is powered by the conventional automotive power train regardless if the power source be it internal combustion engine or electric battery (i. e., transmission, differential, axles, etc.)

(6) Also, front wheel drive and rear wheel steer is another feature coupled with this group.

(7) Even though there are only two types in this group, as against twelve in the other, the capacity and model range is by far greater.

GENERAL—(8) The above chart is intended to make a broad classification of the most common types of fork lift trucks. There are, of course, some special units which are exceptions—such as the side-loader differing from the ordinary lift truck in the *principle of carry* characteristic. Another exception is the "Elbow-Lift" type, which has only recently been introduced.

Definitions—

(A) *Type of drive.*

(1) "Powered wheel" package. (Same as drive used in Group I lift trucks.)

(2) Conventional automotive type power train. (Same as drive in Group II lift trucks.

(B) *Drawbar pull*—Even though this is a capacity rather than a physical characteristic it is included because it is such a distinguishing feature in defining a tow tractor.

Present range of drawbar pull is from 500 to 30,000 lbs.

(C) *Source of Power*—Gasoline, LP Gas of Diesel Engine; Battery or gas/electric power unit.

(D) *Type of Tires*—Solid, cushion or pneumatic.

Using these characteristics tow trucks can be classified broadly into two types:

TYPE 1—

(A) "Powered Wheel" package

(B) 500-750 lbs. Drawbar pull range

(C) Battery, gas/electric or gas (small)

(D) Solid tires only

TYPE 2—

(A) Automotive type drive

(B) 500 to 30,000 lbs. Drawbar pull

(C) Battery, gas/electric, gas, LP gas, diesel

(D) Solid or pneumatic (principally pneumatic) tires

Platform Truck

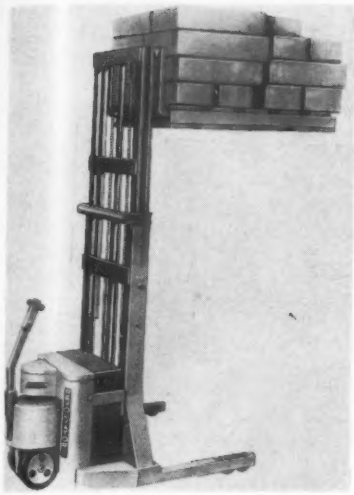
Definition:—A platform truck is a mobile, self-propelled, powered unit which is provided with a rigid, stationary deck or platform. Its primary function being the *transportation* of material.

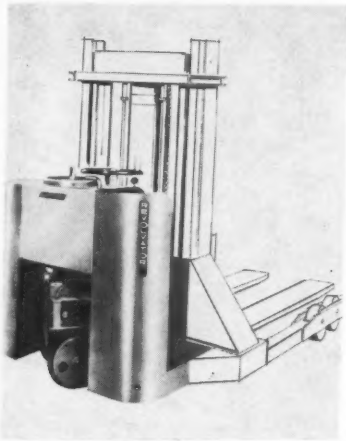
In no way is it self-loading and must be loaded and unloaded by separate means.

It is normally available with deck loads up to 6,000 lbs.

Power sources available: battery, gas/electric, gasoline, LP gas.

Note: Since the uses and application of *tow trucks* and *platform trucks* are for the most part self-explanatory, and much simpler to comprehend than *Lift Trucks*,





Top to Bottom: Figs. 8, 9, 10 (Types 8, 9, 10)

lengthy details have been omitted in both cases.

SECTION III

Accessories

Some of the more popular accessories are; drivers overhead safety guard; carriage extension backrest; power-steering; steering wheel spinner knob; engine hour meter (usually standard); head and tail-lights; fire extinguisher; and water muffler (eliminate sparks).

Note: The selection of accessories is usually precluded by working conditions which dictate them as "necessities" rather than "accessories".

Attachments

Attachments have reached a place of great importance for today's lift truck user—in most cases the object being to eliminate pallets. They divide into two categories, mechanical and hydraulic—mechanical being the less costly of the two.

A great variety have been developed for handling drums, since so much material is received and shipped in this type container. In addition, there are clamps with many types of arms for handling bales, cartons, crates, etc.; hydraulic side-shifting carriages; load stabilizers; booms; rams; bottom dump boxes; and many others too numerous to mention.

Note: The installation of an attachment on a lift truck quite often limits its versatility and should therefore be carefully considered before selection.

Safety Equipment

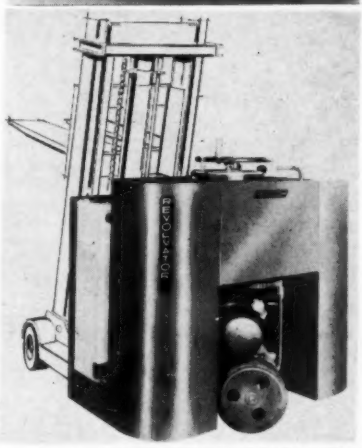
GS (gasoline safety); DS (diesel safety); LS (LP gas safety); DX (diesel explosion-proof) and EX (electric explosion-proof) classifications have enabled lift trucks to be used in areas where they were previously excluded because of fire hazards and/or regulations. Close consultation between the insured and his insurer is the determinant.

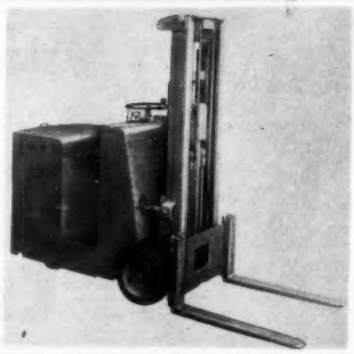
Summary

It is important to remember that within Powered Floor Equipment there is one last important division and that is *transporter* as against *stacker*. *High lift* trucks are *stackers*, all the rest are *transporters*.

Always try to remember to select a truck for the purpose for which it was designed. Too many times a high lift truck has ended up as a transporter and all of the expensive hydraulic mechanism is wasted.

Figures 10 and 14 courtesy of Lewis-Shepard Products, Inc.





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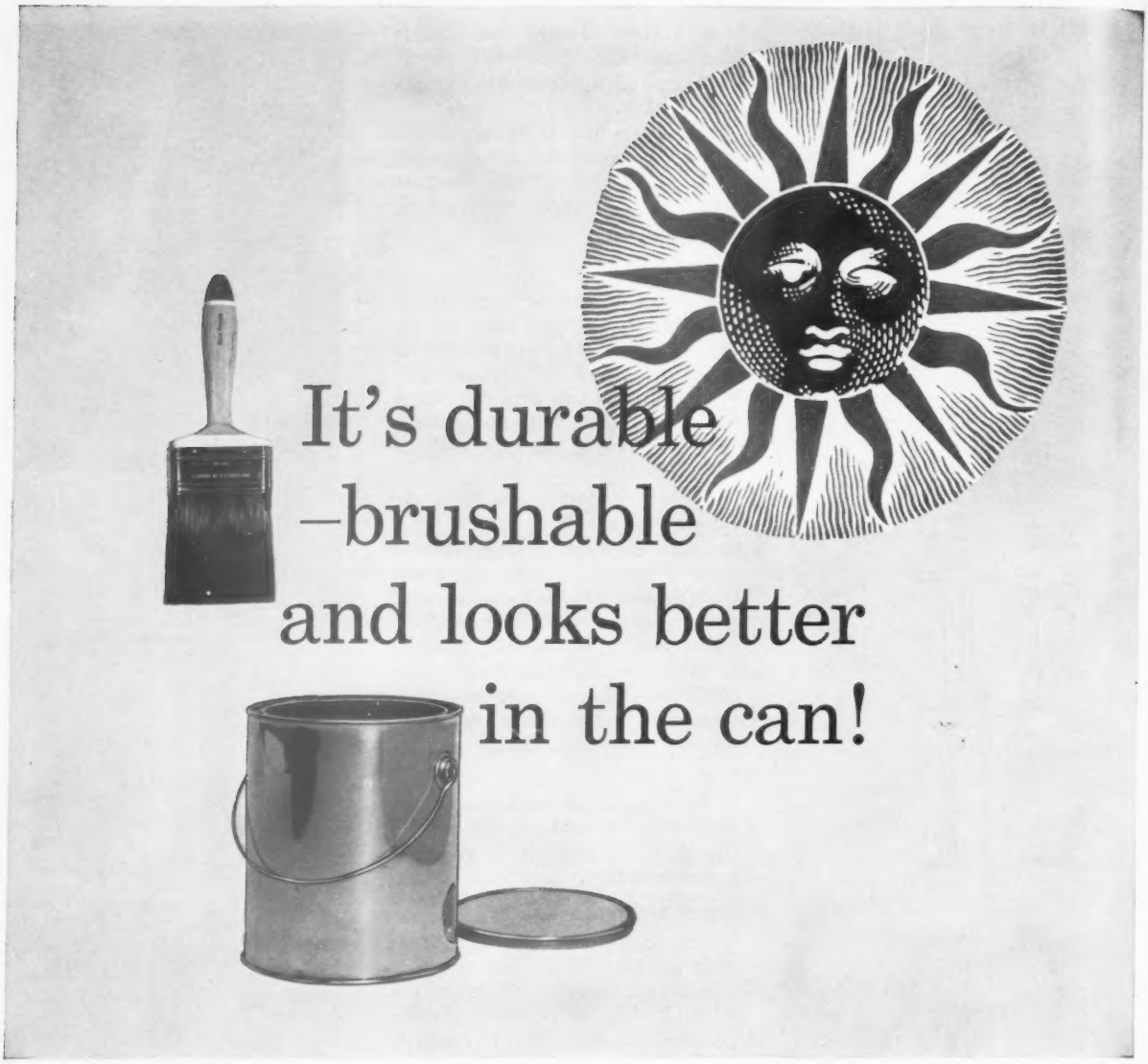

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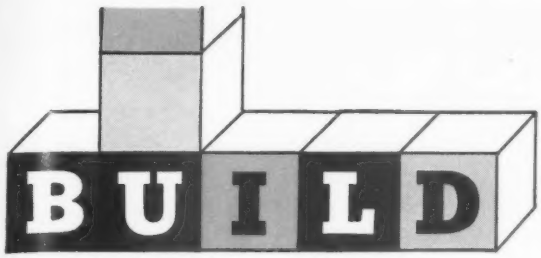

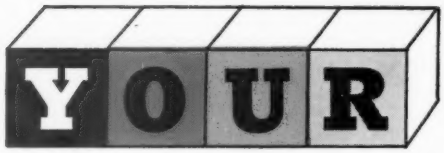

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HAND EQUIPMENT

By

Robert P. Rudy

IN presenting an analysis and summary of hand equipment to be used in your material handling program in plant and warehouse, we must be cognizant of the great improvement and advancements made in powered equipment, automation, etc., which is increasing the scope and range of the material handling engineer. However, in hand propelled equipment, the demand seems to be increasing. Every day the need continues, the requirements mount, and the manufacturers keep turning out hand powered equipment at an increasing rate.

There is a basic logic behind the continuing and future use of hand powered floor equipment. The small shop, the short haul, the specialized operation, the economic situation, the definite nature of the load or job being handled, are a few examples for the popularity of hand powered equipment. I am sure any one of you can substantiate the use and application of hand powered equipment in your operations. Your plant efficiency and managerial economies will be heightened by your knowledge of this equipment and where and how to use it. Let us examine the "tools" we are to work with and the type of load we are going to move.

About the Author

Mr. Rudy is President of the materials handling firm, Robert P. Rudy Company of New York. He currently does materials handling consulting work and also acts as manufacturers' representative for some of the largest manufacturers of materials handling equipment.

Back in 1937 Mr. Rudy wrote his M.I.T. thesis on materials handling. During the intervening years he has put this knowledge to work in plants and warehouses ranging from the very smallest to the very largest, covering all possible applications and employing all types of equipment.

Mr. Rudy is one of the Board of Directors and also Chairman of the Technical Committee of the New York Chapter of the American Materials Handling Society; a member of the New York M.I.T. Club; a member of the New York Chapter of the Society of Industrial Packaging and Materials Handling Engineers; and a member of A.S.M.E.

Load and Equipment

First—The Load

Drums, barrels, pails, cans, leverpacs, cases, cartons, bags, (bulk liquid, powder and broken solids). Any of these loads can be arranged in units from 25 lbs. to 6000 lbs. units and still be moved across the floor with hand powered floor equipment.

Second—The Equipment

Wheels, casters, 2-wheeled hand trucks, dollies, wheelbarrows, 4-wheeled platform trucks, semi-live skids, special design wheeled trucks, hand mechanical and hydraulic skid and pallet trucks, skids, pallets, hand operated portable elevators.

Third—Materials of Construction

Wheels—steel, rubber, plastic, canvas, polyurethane

Trucks—wood, steel, aluminum, magnesium

Drives—hand, battery, power line and gas engine

Fourth—Controlling Selection Factors

Floor types and actual condition

Distances loads to be moved

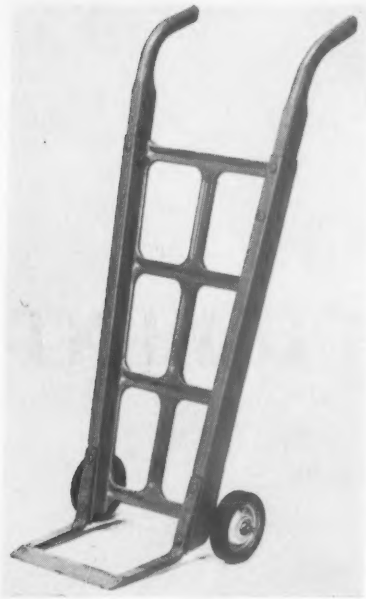
Type and nature of load

Types of wheels and bearings

Ramps

Truck loading and unloading via dockboard or other

You can see from the above breakdown that there are many possibilities in your choice of equipment. We must, therefore, plan the use of our hand equipment exactly as we do our conveyors, cranes and fork trucks. Hand equipment is the least expensive item in your equipment budget and can be your most productive.



Wheeled Hand Truck

Applications

Let's look at a few applications in the typically crowded plant. Can we clean up the floors to provide clear aisles and clear storage space next to our production machinery? If so, the 2-wheel specialized drum handling truck is a natural and easy method. Or, do we have any combination of cartons or bags under 750 lbs. which will fit on a 2-wheel hand truck? No question about the logic of the 2-wheel hand truck in these situations—perfect in either small or large plants.

As the load gets larger, or is from 750 lbs. to 1250 lbs., we can justifiably use the semi-live skid, which not only allows movement, but now permits storage as well. This is an excellent tool when properly used.

Of course, the 4-wheel platform truck meets almost every need for moving the combination loads from 750-3000 lbs. where we can manually load the 4-wheeler. The 4-wheeler, however, takes up floor space when not in use and cannot be used for storage. It is better, however, for longer and heavier loads than 2-wheel hand trucks.

This leads us to the prime example of unit load movement combined with storage—the skid and the pallet. The skid is used principally where storage and movement without stacking is required. The hand skid truck is an ideal mover, as it generally has large wheels with good bearings and can move loads up to 4000 lbs. without much difficulty by one man, where floors are good and distances not too great.

The pallet is not only for horizontal movement, but now allows us the feature of vertical storage. (We are not discussing the fork truck here.) But how often it is that a small hand pallet truck is needed to move the pallet short distances and in tight corners and in and out of elevators. Select the hand pallet truck whenever you use pallets and fork trucks. You will find it an indispensible combination piece of equipment.

Not to be confused with fork trucks is the portable elevator. This is a hand pushed unit—usually—although you can now get power wheel attachments for it. These are used for a multitude of

Hand Truck for Transporting Drums

in-between purposes, truck loading and unloading, stacking, dumping drums, etc. Good planning and selection can make this a profitable equipment choice. It is generally used for loads of 100 lbs.-2000 lbs.

Perhaps the most difficult piece of hand pushed equipment to select is the "special" truck. This is the item never found as a manufacturer's standard. The plant engineer or material handling man designs it to handle unusual equipment or loads. You can build your own by picking from a wide choice of casters and wheels available, or any competent material handling man can help you design one.

The most important thing is to make sure the trucks are practical and easy to handle and also that they don't take up a lot of valuable floor space. I think one of the vital things to keep in mind about manually pushed equipment is that they should never be in such profusion that they take up valuable floor space. Every consideration and planning must be made to properly evaluate the use of special trucks and the quantity in use.

Proper Use of Equipment

A survey of the "do's" and "don'ts" for some of our basic tools previously mentioned will always prove helpful.

Wheels

NATURALLY the larger the wheel, the easier it is to roll. Also, the larger the wheel, the more load can be carried. We must be practical about our choice, and you will find that standard catalog trucks usually have the proper size wheels already selected. However, the composition of the wheel is left up to you.

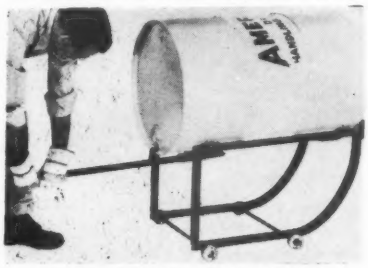
USE steel wheels only when loads are very heavy for the wheel size and if the floors are in bad shape. There is no point in pampering bad floors with rubber or composition wheels when they won't help either the floor or make it easier to push the equipment. However, if the floors are fairly good to fine, or real good, by all means select rubber or composition wheels. Just having a quiet rolling truck is a bonus. But remember that

Wheeled Platform Truck

the rubber and composition wheels today will take any of the loads we have been talking about without any trouble whatever. The "easy-rolling" rub-

ber or other similar materials literally perform miracles.

LET us not forget the bearings. The expression "plain bearing" usually means "friction bearing", such as oilite bushings or even plain sleeves. These can be used for extremely light work, under corrosive or certain thermal conditions of cold or heat, or in wheels which rarely ever have to move—such as a floor-safe. However, most wheels have "anti-friction bearings", either ball or roller of various kinds. Ball bearings can be sealed against dirt and most corrosion. Ball bearings actually roll best, when properly selected, but usually are used on lighter loads. Roller bearings can take a lot of abuse, heavier loads, and grease guns can "purge" them of dirt. It takes a pretty good engineer to know which type to select on any new type of equipment, and sometimes economics provides the answer.



Portable Drum Cradle

Casters

PUTTING the wheel in a separate yoke gives us the rigid caster and the swivel caster. When buying your casters from now on, please give it a little more thought. Don't buy price. Know your application, the floors over which they must move the load, frequency of use, ease of assembly. The caster and wheel manufacturers now provide some of the most complete and detailed catalogs with a multitude of options to meet the most exacting of your requirements. You can get wheels and swivel caster rigs which are sealed against almost any condition.

2-Wheeled Hand Trucks

WHAT a vast variety to select from. But here most manufacturers have given their trucks names to assist in your selection. By all means use the lighter metal trucks where possible. It may cost a little more, but reduces one's efforts. A major variety in hand trucks is the Eastern pattern (wheels inside the frame) and the Western pattern (wheels outside the frame). Do you prefer better balance or quicker turns?

4-Wheeled Platform Trucks

AGAIN, a vast variety from which to choose, but good judgment should help here. You might question a steel deck vs. a wood deck. Wood prevents slippage as against steel, but steel is lighter for equivalent capacity. Wood is generally cheaper. Use end racks on 4-wheelers—open or slatted to retain the load. Always push 4-wheelers from the swivel caster end.

Portable Elevator

Low Lift Pallet and Skid Trucks

THE principal feature of these trucks is that they only lifit 3" or 4", just enough to raise the pallet or skid for transporting. Different manufacturers feature either, the mechanical lift or the hydraulic lift. Before buying, you should study both types to determine which is more suitable in your plant. These are generally heavy trucks, 200-400 lbs. when empty, and should, therefore, have ample size wheels, and must have good bearings. Brakes can also be had if you have ramps to negotiate. Here you can select the truck having the capacity you actually require—and the proper choice will permit easier handling. Some manufacturers offer these trucks of light weight metals, a sensible trend for heavier hand pushed equipment.

Portable Elevators

THESE units are manually pushed, manually raised and lowered—or battery or straight electric lift. These are not easy trucks to push by hand because they have small wheels. For loads up to 1000 lbs., it is feasible to push these by hand, but only for short distances. However, this piece of equipment is principally purchased for its ability to move vertically rather than horizontally. Extreme care should be exercised to make sure that the portable elevator is locked into position for vertical movement by the floor lock and when pushed horizontally, the load is close to the floor to eliminate any possibility of the truck tipping with the load.

Ramps

MOST plants, including new and old, have various and sundry ramps around. Usually they are too steep for power trucks or badly situated for power trucks. This means that manually pushed trucks carry loads up and down. Now here is the poser—does one pull or push a truck up a ramp? The method of going up should be dictated by safety. I would never hesitate to get help if necessary. It is easier to push than pull, but make sure proper braking is available to prevent the load slipping back on the pusher. Some plants install a chain in the ramp similar to those in a car wash to help the trucks up the ramps. When going down the ramp, I always suggest the load be kept ahead of the pusher. Be sure brakes are available, but at least you can release the load without danger of personal injury.

Today most plant personnel are so familiar with powered equipment that they will be very selective in their purchase of manual equipment. I hope the survey above has helped awaken some latent ideas and pointed the salient safety features. You will generally find that manually pushed equipment is 1. most economical 2. space saving 3. has very little maintenance 4. has a great deal of versatility.

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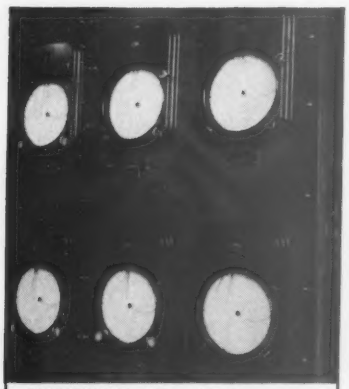

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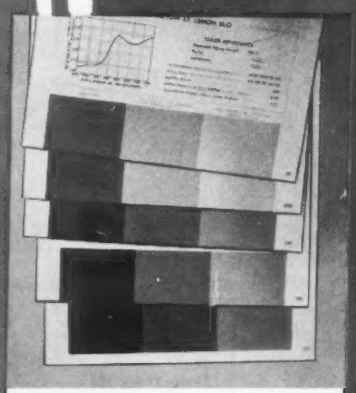

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HOISTS AND OVERHEAD EQUIPMENT

By
G. A. Andree

KEEPING production on the move economically is the chief function of overhead load handling equipment in the coatings and finishes industry.

First, however, it must be understood that such equipment is here defined as "in the air" hoists and cranes and their accessories.

While this statement of major function may seem far-fetched, it is fact never the less. For example, consider the effect on production if a motor on a big paint mixer fails and has to be replaced. To install that motor in the first place, undoubtedly a sling of some sort was attached to the eyebolt on the motor frame. Then an overhead lifting device of some type was used to position the motor. It will be necessary to use similar load handling equipment to remove the motor for repair or disposal and to set the new one in its place.

Efficient hoists and cranes can reduce equipment down time substantially and thus help control both production and maintenance costs. By helping to get pumps, mills, process piping, presses, valves and other equipment back in service quickly, hoists and cranes can contribute substantially to the profitability of the total manufacturing operation.

About the Author

George Andree, General Sales Manager, Shaw-Box Crane & Hoist Division, Manning, Maxwell & Moore, Inc., Muskegon, Mich. has long and diversified experience in the application of materials handling equipment, particularly "overhead" devices like hoists and traveling cranes. His background in the engineering and estimating departments of the Shaw-Box Division was enlarged by field sales engineering involving the use of cranes and hoists in all kinds of industries. He became Pittsburgh District Manager in 1941, then transferred to the home office in 1948. After serving as Assistant General Sales Manager, Mr. Andree was appointed Director of Engineered Crane Sales. He held the latter position until taking over general sales management of the division in September, 1954.

But the value of overhead load handling devices and their accessories is not confined to helping maintain process flow alone. Numerous other significant purposes are served, and the variety of available lifting equipment attests to the thought manufacturers in the hoist and crane business have given to the subject.

Choose Hoists to Fit the Job

Like many other process industries, that of paint and varnish has plant areas where conditions can be hazardous and/or corrosive. When a hand-operated hoist or chain block is needed for work in such areas, the best choice is the spark and corrosion resistant type. Such hoists are built in sizes that will handle as much as 10 tons. Where hoist use includes I-beam travel, even the trolley can be had in the spark and corrosion resistant type.

Air hoists are sometimes favored for service in hazardous atmospheres and can be bought in capacities up to 15 tons. The complete absence of electrical elements, the high lifting speeds, and the load spotting accuracy obtainable make these hoists mighty attractive. Such hoists are also made with the spark and corrosion resistant feature so important in applications in the industry.

Electric Hoists, built in sizes to handle loads up to 15 tons, are particularly useful in plant shops where equipment is repaired and rebuilt, and new units are sometimes constructed for experimental purposes. They are available with

Portable tool being used here not only lifts but pulls. The handle takes the place of the hand chain on a regular chain block. Small size, light weight and muscle-saving efficiency make it useful in many ways.

roller chain, link chain, and wire rope load lines. Push button controls are fast replacing other types on all electric hoists.

Another application of great importance is in the shop where the company's material handling truck (fork truck) batteries are recharged, and front-end accessories like grabs, forks, barrel clamps, scoops and so on are interchanged as job needs require. Not to be forgotten is the essential work done by hoists in the automotive repair shop where the company's highway trucks and trailers are maintained. Also of practical interest is the availability of electric hoists which operate from a 12-volt auto battery. Sizes are made to handle up to 2 tons. Some companies install them on an I-beam or davit over the deck of stake and panel trucks to speed the loading and unloading of drums and to cut down on truck turnaround time.

Probably one of the most useful low-cost material handling devices for the plant maintenance man is the small, light-weight lifting and pulling tool with load chain and handle. Per pound of weight, this portable device has enormous lifting power. The size that can lift or pull a 1-ton load weighs only about 16 pounds; and only 40 pounds of muscle effort is necessary to move that ton. Built with gearing like that in the most efficient manual hoist of standard design, this powerful tool can be operated at any angle merely by pumping the handle. (For obvious reasons, models of the spark and corrosion resistant type are preferred in the industry.)

Because of its compactness and lightness, this versatile hoist can be operated in locations and in positions where no other type can be set up. For instance, suppose a new rubber belt on a conveyor is to be joined. This tool makes the "pulling together" of the belt ends an easy job. Or, assume process piping must be replaced or relocated. This lifting and pulling device is just the thing to position pipe for hanger installation or to connect to shut-off valves or to tanks, vats or other processing or storage vessels. Numerous instances have been found where this type of hoist has been permanently installed over equipment which must be inspected or disassembled periodically. In the main, however, it is a maintenance tool capable of doing everything from lifting and shifting machinery components to stretching electric cable.

Safety Features

Each of the manually operated hoisting devices mentioned here has an automatic load brake to prevent load back drop. The electrics have two automatic brakes, one a load brake, the other a motor brake. They operate simultaneously, and either one alone has adequate braking power to hold the load safely. Only 24-volts at the push-buttons is another protective feature. Braking action in air hoists is effected by a conventional load brake, plus the braking power of the air motor itself.

In addition, the hooks on all these hoists are of the non-fracturing type. They open slowly when overloaded and thus give visible warning of the potential hazard.

Features like these are indicative of the protection built into hoists to prevent accidents that might harm personnel, material, and the lifting device itself.

Types of Cranes Available

Overhead cranes, as distinguished from mobile rubber-tired indoor cranes and outdoor crawler type cranes, contribute special advantages even if their chief function is frequently confined to standby service or to transfer loads from storage yards to processing bays in the plant.

First there is the all-electric overhead traveling crane that is operated from a cab underhung on its bridge or from a pendant cord push-button control station held by a man on the plant floor.

Typical of the low-cost bridge type cranes is this floor-operated model. Cranes like this are standardized, the buyer can make his selection from a catalog. Note that a load scale is being used to weigh the load while in suspension.

The 12-volt battery of the truck operated this electric hoist. Merely stepping up the charging rate of the generator keeps the battery full powered.

Normally in building a plant of any sizeable proportions, cranes like these are erected early in the construction phase to help install the new processing equipment, then to simplify the job of maintaining it.

Also included in the overhead crane classification are the following types: 1) the completely manual crane which requires overhand pull on hand chains to travel the bridge, to operate the trolley laterally, and to lift and lower the load; 2) the crane equipped for electric travel, with manual hoisting and trolley traverse. Other combinations are also produced.

There was a time when practically every crane was individually engineered for the specific application. Today, however, accumulated experience has resulted in many highly standardized components. In fact, major units for even some fairly big cranes are now stocked by the manufacturer. Naturally this eliminates a big percentage of special engineering costs and gets the crane on the job faster.

One of the newest developments is the hydraulic crane. This bridge-type crane, available in capacities to 10 tons, incorporates explosion proofing to an amazingly high degree. One single speed electric motor actuates hydraulic pumps which provide all the power needed to travel the crane on the runway, to move the trolley laterally across the bridge, and to lift loads with the hoisting unit. At the same time, this type of crane makes available in the operator infinitely variable speeds—a notable asset when loads have to be handled with extreme care and precision among expensive processing units.

Swinging jib cranes are extremely useful in lifting covers from large processing units, but their fixed position limits the area that can be served. However, a single swinging jib installed between two kettles can be used effectively when service is necessary on either or both.

But the best use of the swinging jib is in the maintenance shop where equipment components are handled in disassembly and assembly, as when large valves are being reseated and otherwise refurbished before going back in the line.

An interesting development in low-capacity cranes (to 2 tons) is the mobile Gantry "A" Frame. This caster-equipped "bridge" can be pushed, pulled and turned about anywhere in the plant or out doors. A hand hoist or an electric hoist is installed on the I-beam that bridges the A-shaped end frames. Loads can be lifted by the hoist then transferred to other locations on the Gantry without rehandling. Cranes like this can be used effectively in assembling and dismantling plant equipment as well as in servicing highway tractor-trailers and the in-plant fork trucks that handle pallet loads.

There are on the market today numerous "do it yourself" crane assembly kits. With all components except the I-beam and shaft supplied by the manufacturers, it is practical to build jib cranes or bridge cranes without drilling, machine work, or special tools. A wrench is just about the only tool required in assemblying even a crane with capacity up to 10 tons. Aside from saving money by doing the assembly job right on the plant property, there's quite a cost advantage in buying the I-beam locally instead of paying long-haul freight charges on the metal.

Below the Hook Devices

No discussion of overhead load handling equipment would be complete without mentioning "below the hook" devices. Most important among the great variety available is the load scale. This device eliminates needless rehandling in repetitive weighing operations. For example, assume that filled drums are to be picked up individually at one location, then weighed before being moved elsewhere. With a load scale installed between hoist or crane hook and the load, weighing can be done while the load is in suspension. There is no need for rehandling as would be the case if a portable or pit-type platform scale were used.

Last but not least among the overhead load handling specialties are various types of drum and

(*Turn to page 162*)

A "do-it-yourself" crane building kit of the simplest type is shown here. Buying the I-beams locally saves a lot. Both hoist and crane kit are sold by industrial supply distributors.

New

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PUMPING LIQUIDS

By
Anthony Scala

LIQUID materials in general are usually handled by some form of pumping machinery. In the paint and varnish industry, pumps are called upon to move liquids that are water-thin, and also liquids with viscosities up to Z-6 on the Gardner-Holt bubble viscometer. Besides this, the specific gravities may range from less than 1.0 up to several times the weight of water. Thus, it is apparent that there is a great diversity in the pumping problems of the paint and varnish industry which, by the very nature of its products, operations and raw materials, is unable to properly settle on any one type of pumping equipment as universally applicable.

Varnishes

Now let us consider liquid handling in the varnish plant. You are aware that such liquids from the basic oils, the bodied oils,—up to the thinners vary considerably in viscosity, besides having a wide range of temperatures during the various stages in the manufacture of the varnish. For handling the thinners where a positive head is available on the suction or intake side of the pump, a centrifugal or a turbine type of pump may be used. As these types are limited to liquids of 750 SSU maximum, slow speed, positive displacement pumps must be installed for handling linseed, castor, tung oils and others of that type. The varnish industry has generally adopted the rotary pump for this service. It is most important that the proper size pump be installed, and that the pump operate at an efficient speed commensurate with the viscosity of the liquid being handled. Never use the same pump installations (or even duplicate pump installations) for handling low viscosity hot varnish and high viscosity tung oil.

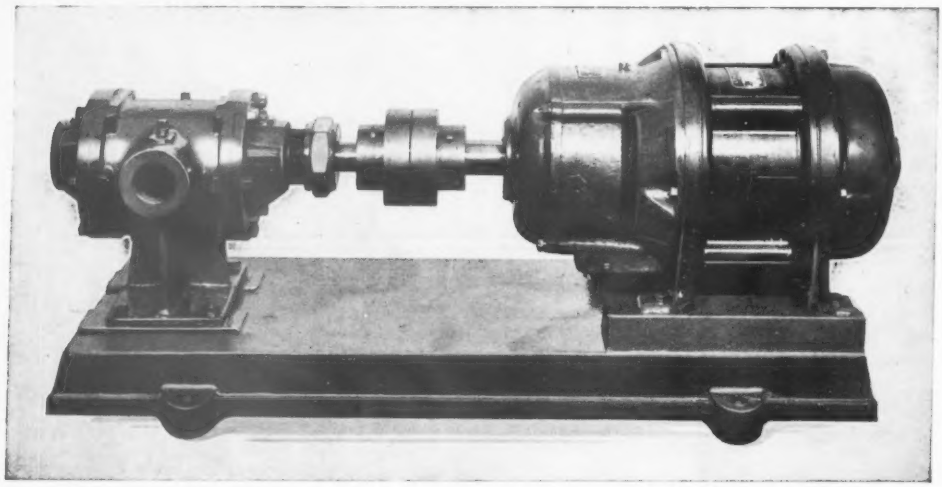
About the Author

Anthony Scala has been associated with the Foster Pump Works, Inc., of Brooklyn, N. Y. for 43 years. In his capacity as sales engineer, Mr. Scala has had wide experience in the development and design of pumping equipment to meet the requirements of the paint and varnish industry. He is presently treasurer of Foster Pump Works and is a member of the New York Paint, Varnish and Lacquer Association.

Paints

In the manufacture of paints, rotary pumps have been found to be the most serviceable units. Because of the high viscosities of the paint pastes, it is extremely important that the pumps handling these products operate at a speed no greater than the flow or the drop of the paste into the pump. If the pump revolves too fast, it will receive and discharge the paste in "slugs", instead of in an even, continuous flow, Besides this, the wear and strain on a pump unit, because of the unevenness of the pumpage under such conditions, will be in excess of normal tending to accelerate wear. As pastes go, lead in itself when combined with oil is a sort of lubricant and pumps handling this mixture seem to require much less maintenance than do pumps that handle other types of solids, as titanium dioxide, silicas etc., used in some paint formulations

A good maxim to follow in liquid (or semi-liquid) materials handling is to pump the liquid at no faster speed through a pipe than 50% greater than the same liquid would flow through the same pipe unassisted. Assume you had a tank of tung oil, one-hundred feet up in the air with a pipe running from the tank to the ground. If you open the valve and the temperature of the tung oil is such that



Gear Motor Driven Rotary Pump

it takes it one minute to flow down from the one-hundred foot high tank to the ground, the flow of oil would be referred to as "one-hundred feet per minute". And to handle this flow of oil through similar piping, either vertical or horizontal, it would not be advisable to use any pump whose vanes, lobes, or gears travelled inside the pump casing at a peripheral speed of greater than 150 feet per minute.

Viscosity

The thicker the liquid material handled, the more viscous it is, and the larger pump (operating at a slower than normal speed) will be needed to obtain a given pumping capacity. A certain size pump may deliver 100 gallons per minute of hot varnish with a viscosity of 1500-2000 SSU. The same size pump, if operating on bodied oils of Z-3 to Z-6 viscosities should be slowed down from normal speeds to about half that used for the hot varnish. Also the capacity would be reduced also proportionally.

In handling thinners no such problems of viscosity are encountered. These liquids can generally be handled by centrifugal or turbine types of pumps, where a flooded suction is available. In some cases it is necessary to "suck up" the thinners to the pump, and for this certain types of self-priming centrifugal pumps may be used. On such installations the pump inlet and outlet should be trapped so that the volatile liquid in the priming chamber will not evaporate. Rotary pumps, having a positive displacement, are not dependent on priming and can "suck up" the liquid from normal distances below the pumps.

Pipes and Piping

At this time it may be adviseable to consider the pipes and piping through which the liquid materials are moved and handled. Oftentimes too small a diameter pipe is used. Never should a smaller sized pipe than 1½" be used for handling a MAXIMUM of 20 gallons per minute of any of the varnish oils. For pumping 50 gallons per minute, 2" pipe should be the MINIMUM size, larger if possible. And at least a 3" pipe should be used for up to 100 gallons per minute. It must be remembered that varnish oils, either processed or unprocessed will oxidize when in contact with air. Unless the pipes are continually filled or unless they are flushed out with solvents after use, oxidization, continuously repeated, will cause a build up on the inside of the pipes like the layers of an onion. Thus, the inside diameter of the pipe is lessened. There are records of a 2½" diameter pipe with some twenty years of service that was found so constricted when examined, that its actual inside diameter was about ¾". Thus, large diameter pipes as is ecomically possible should be used.

Filtering

While filter press processes and the clarification of varnish might not be thought of as "materials handling", nevertheless pumps must be used to propel or "handle" the varnish through the press. Therefore, it can be properly discussed here.

Formerly it was customary to "settle" the varnish for considerable periods so that most of the unwanted solids were removed before filtering. The filter-press pumps which handled the varnish products then would operate efficiently for long periods because of the clarified nature of the pumpage. In todays processing, filter-aid expedites the clarification. However filter-aid, whatever its form, is abrasive, and its action on filter-press pumping equipment is analogous to what would occur in the cylinders of your automobile motor if your were to put a spoonful of emery powder in the tank every time you had it filled with gasoline. Varnish makers should reconcile themselves to more frequent repairs and replacements of filter-press pumps, when filter-aid is employed as a clarifying agent. It is not advisable to use a fixed capacity pumping unit for filter-press work. At the beginning of filtering, with clean frames and practically no pressure required to "push" the pumpage through the press, a far larger capacity in gallons per minute can be clarified than is the case when the frames become

loaded and pressures of from 50 to 60 pounds are necessary to push the resulting filtrate through the press. Satisfactory results are being obtained by the use of positive displacement rotary pumps, driven by variable-speed gear-motors, which automatically "watch" the pressure build up in the press as it "loads up". Then such a pump automatically varies the capacity of the varnish being pumped to the exact maximum that the press can handle. It also automatically cuts down on this capacity as the filter-press becomes more and more clogged. Finally, when the filter-press cannot filter any more varnish, the pump unit automatically stops. Such an automatic pump unit on the filter press does away with the necessity of human attendance of the press when it is operating. Also the varnish is only passed through the pump one time and not repeatedly as is the case when excess pumpage is manually by-passed around the pump and back to the supply source, since the pressure increases on the filter-press, preventing the varnish from passing through at full capacity.

Lacquers

In the lacquer industry, pumps are called upon to handle very light volatile liquids.

Because rotary pumps are of the positive displacement type-possessing "sucking" ability—they are used in many instances to elevate these liquids, raising them up from underground tanks and delivering the liquids to a final destination at varying heights above the pump. In handling extremely volatile liquids, even though the pump may posses good "sucking" ability, the nature of the liquids and their volatility will govern the actual maximum suction lift that it is possible to use. Too high a suction lift on an extremely volatile liquid will result in merely a thick vapor being discharged from the pump; the result of a secondary form of vacuum distillation being set up in the pump itself. This is the result of the high vacuum generated by the pump in attempting to meet the high suction lift conditions.

In paint and varnish plants where ten to twenty or more pumps are used as materials handling units in production, all of these pumps, if possible, should be the same type and size and manufacture; or, at least, of no more than two sizes of the same type and manufacture. Practically every paint and varnish plant could be served by pump capacities of 25-75 gallons per minute; or by 35 gallons per minute and 100 gallons per minute. On some operations these capacities might be greater than are necessary, and on others the same capacities might be less than are desirable. But the advantage of standardizing on one single pump size (or two) throughout the plant is manifold.

Spares and Repairs

Most obvious is replacement and repairs. With only one (or two, if two sizes are in use) pumps as spares, every production pump in the paint and varnish plant has a spare immediately available! Furthermore, each pump part in the store-room will thus fit or replace the corresponding part in *every* pump in the plant. Down time is kept at a minimum. The worn pump, when replaced by the spare, can be sent to the manufacturer for repairs and, when returned, placed in the store-room as a "spare". In this manner a spare pump or pumps are always available, with no fitting or adapting, because all of the pumps are identical.

Finally, to keep the need for replacement spare pumps and parts at a minimum, your liquid-handling pipe lines should be of as large a diameter as is economically possible. Also, do have them installed in exposed positions, alongside of walls and ceilings, not in them. Pipes out in the open means easy repairs.

Operate your liquid-handling pumps as slowly as possible. This will extend the pump's life. A larger pump operating at half-speed and pumping the same capacity as a full-speed smaller pump will cost far less in maintenance than will the high speed smaller unit.

Pumping Powders

A recent development in materials handling is light, dry, powdery materials being moved by positive displacement rotary pumps. For decades air-blasts and blowing have been used to empty or to fill cars or elevators with flour and grains. Now it has been demonstrated that pigments and other dry materials used in paint manufacture have a consistency similar to flour, and possess some lubricating properties. These may be handled as a dry medium by positive displacement rotary pumps.

Aluminum powder of various screens, used in aluminum paint, has been successfully "sucked up" by a rotary pump and then pushed up to heights of over twenty feet. Because of the settling properties of aluminum powder, normal pumping procedure at the start and the

Series of four rotary pumps equipped with built-in-by-pass and relief valves driven by explosing-proof motor.

GARDNER-HOLT BUBBLE VISCOMETER Designation	CAPACITY IN GALLONS PER MINUTE									
	10	25	35	50	75	100	125	150	200	250
A to T (to 2,500 SSU)	1½" Dia. Pipe	2"	2"	2½"	2½"	3"	3"	3"	4"	4"
U to W (to 5,000 SSU)	2" Dia. Pipe	2½"	2½"	3"	3"	4"	4"	4"	4"	5"
X to Y (to 8,000 SSU)	2½" Dia. Pipe	2½"	3"	3"	3"	4"	4"	4"	5"	5"
Z to Z-1 (to 12,500 SSU)	2½" Dia. Pipe	3"	3"	4"	4"	4"	5"	5"	5"	6"
Z-2 (to 16,500 SSU)	2½" Dia. Pipe	3"	3"	4"	4"	5"	5"	5"	6"	6"
Z-3 (to 21,000 SSU)	3" Dia. Pipe	3"	4"	4"	4"	5"	5"	6"	6"	6"
Z-4 (to 29,000 SSU)	3" Dia. Pipe	3"	4"	4"	5"	5"	6"	6"	6"	6"
Z-5 (to 45,000 SSU)	3" Dia. Pipe	4"	4"	5"	5"	6"	6"	6"	8"	8"
Z-6 (to 67,000 SSU)	4" Dia. Pipe	4"	4"	5"	5"	6"	6"	8"	8"	8"
Z-7 (to 175,000 SSU)	5" Dia. Pipe	6"	6"	8"	8"	8"	8"	8"	10"	10"
Z-8 (to 268,000 SSU)	5" Dia. Pipe	6"	6"	8"	8"	10"	10"	10"	10"	12"
Z-9 (to 389,000 SSU)	6" Dia. Pipe	6"	8"	8"	10"	10"	10"	12"	12"	12"
Z-10 (to 485,000 SSU)	6" Dia. Pipe	8"	8"	8"	10"	10"	10"	12"	12"	14"

Table I. Guide for selection of proper pipe sizes for handling liquids at various viscosities.

finish of the pumping cycle must be varied according to the grain size and the weight of the powdered material being pumped. But this method of "dry pumping" is advisable in many cases where the dust in the air is dangerous. Such a system keeps *all* of the dry material in the bins or tanks and pipes, allowing none to permeate the atmosphere of the manufacturing plant.

Selection of Pipe Size

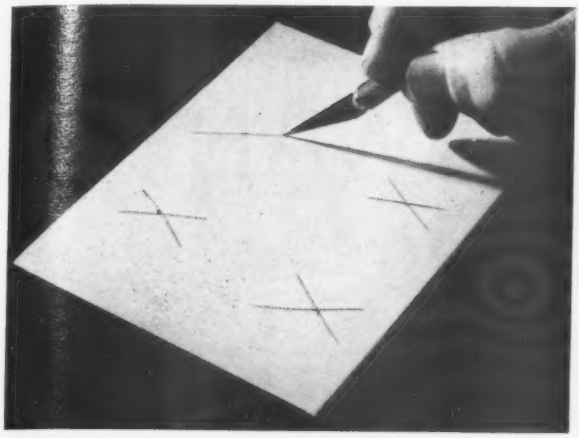
The necessity of the correct selection of the proper pipe sizes for handling liquids of various viscosities at different capacities, cannot be stressed too often. Table I is a Pipe Size Table, showing the nominal inch pipe diameter to use when handling materials of given viscosities, on the Gardener-Holt Viscometer, at various capacities, so as to keep the friction head averaging 50 feet per 100 running feet of pipe.

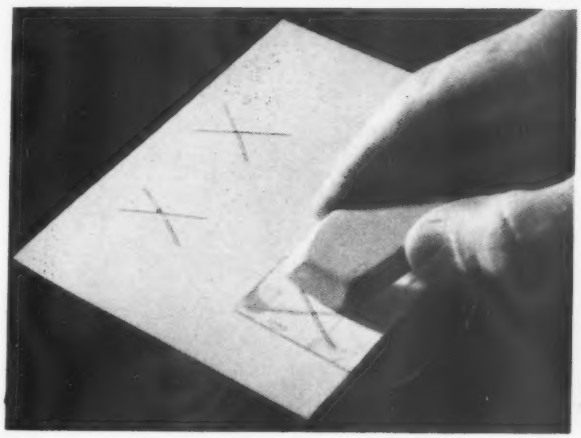
Thus, if you were handling 50-gallons per minute of a varnish with a viscosity of "T" or less, thru a 2½ inch diameter pipe, your friction head in that size pipe for that quantity, would be 45 feet per 100 running feet of pipe. So, if the pump had to pump through a vertical head, upstairs, of 50 feet and then continued through 100 additional feet of horizontal pipe, the total head against which the pump would have to work would be the 50-feet vertical, plus the friction in 150 feet of pipe (50 feet vertical and 100 feet horizontal) at 45 feet per every one-hundred feet, or 68 feet friction head. Thus, the pumping head or the dynamic head would equal 50 feet plus 68 feet or a total of 118 feet.

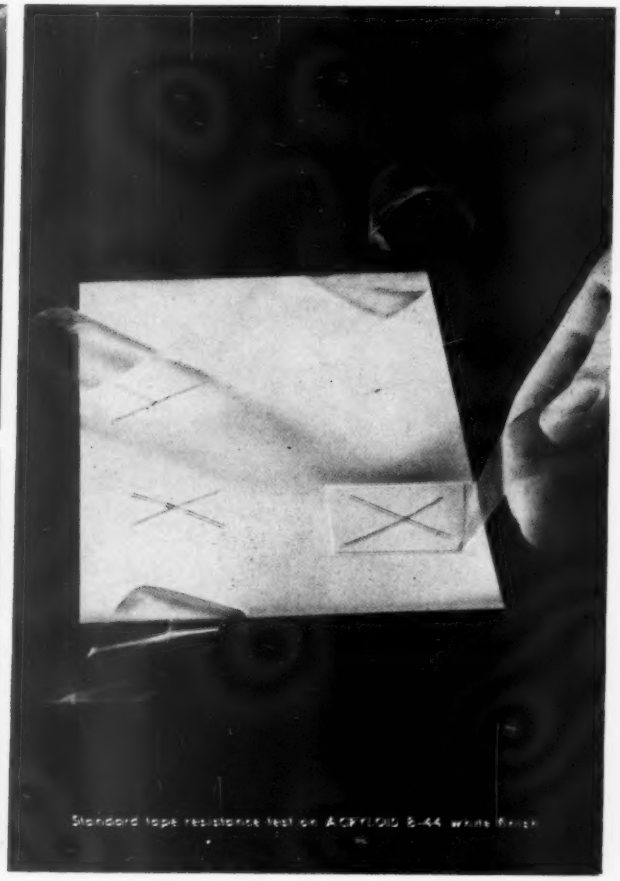
Likewise if you were handling a heavy bodied oil of Z-3 viscosity at the rate of 50-GPM, under similar conditions, you should use a 4" pipe.

For the same reason to pump a thick, tar-like material that had a Z-10 viscosity, it would be mandatory to use an 8" pipe, when pumping at the rate of 50-GPM. Smaller diameters of pipes for the same capacities than indicated in the table can be used, but the friction head will be greatly increased.

ACRYLOID A-21







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ACRYLOID B-44

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CONVENTION PROGRAMS

24th PAINT INDUSTRIES' SHOW

EXHIBIT AREA MAP

EXHIBITORS DIRECTORY

ATLANTIC CITY, N. J., OCTOBER 19-21, 1959

72nd CONVENTION NATIONAL PAINT, VARNISH and LACQUER ASSOCIATION

ATLANTIC CITY, N. J., OCTOBER 22-24, 1959

36th ANNUAL MEETING FEDERATION OF PAINT and VARNISH PRODUCTION CLUBS

JOSEPH F. BATTLEY
President

Officers National Paint, Varnish and Lacquer Association

•

72nd ANNUAL MEETING

NATIONAL PAINT, VARNISH and LACQUER ASSOCIATION, INC.
72nd ANNUAL MEETING

A SUNBURST OF COLORS FOR 1960

Atlantic City, N.J., October 19-21, 1959

WILLIAM E. HOOD
Vice President

J. V. THOMPSON
Chairman, Exec. Committee

A. F. BROWN
Vice Chairman, Exec. Committee

Program of 72nd NPVLA Meeting

GENERAL SESSION
Monday, October 19, 2:30 P.M.
Vernon Room — Haddon Hall

Convention Call to Order
Our National Anthem
Invocation
Introduction of Guests
Painting and Decorating Contractors of America
R. F. Brueggemann, President
Federation of Paint and Varnish Production Clubs
Raymond C. Adams, President-Elect
Presiding.....William E. Hood, Vice President
In Memoriam.....B. F. Swackhamer, Chairman
Report of Treasurer
Preliminary Report of By-
Laws Committee.....Foster Miles, Chairman
President's Address.....Joseph F. Battley
Preliminary Report of Nominating Committees...Horace Felton, Chairman
Introduction of Keynote
Speaker.....Josephy F. Battley, President
Hon. Jacob K. Javits, United States
Senator from New York
Announcements

MANAGEMENT WORKSHOP SESSIONS
Tuesday, October 20
10:00 A.M. — 12:30 P.M. 2:30 P.M. — 5:00 P.M.

TRADE SALES
Chalfonte

"Factors to Consider in Developing New Products" (Marine Room)—Helge Hoist, Arthur D. Little, Inc.
"Problems of Color Merchandising" (Parlor A)—Clarence Deutsch, Color Consultant
"Essentials of Retail Store Demonstrations" (Zodiac Room A)—D. W. Campbell, The Sherwin-Williams Co.
"Time Payment Selling" (Blue Room)—J. C. Evans, The Dean & Barry Co.
"Recruiting and Training Salesmen" (St. Giles Room)—Denton D. Stewart, Benjamin Moore & Co.

CHEMICAL COATINGS
Haddon Hall

"Cost Accounting For Chemical Coatings Manufacturers" (Bakewell and Rowsley Rooms)—Michael Schiff, Professor of Accounting, Graduate School of Business Administration, New York University and Nathan Schmukler, Visiting Professor of Accounting, Graduate School of Business Administration, New York University
"Compensation for Chemical Coatings Salesmen" (Tower Rooms 1333 and 1337—William J. E. Crissy, President, Personnel Development, Inc., and J. S. Schiff, Professor of Marketing, Pace College.
"Chemical Coatings Manufacturers Problem Salesmen" (Pavilion Room—Solarium) J. R. Oliver, President, J. R. Oliver Associates
"Keep It Legal" (Navajo Room and Pavilion)—R. A. Breckheimer, Legal Department, E. I. duPont de Nemours & Co., Inc. and R. D. Horner, Secretary and General Counsel, The Glidden Company

GENERAL SESSION
Wednesday, October 21, 9:30 A.M.
Vernon Room—Haddon Hall

Call to Order
Introduction of Guests
Retail Paint and Wallpaper Distributors of America,
Larry J. Jensen, President
National Paint Salesmen's Association
Lou Snyder, Vice-President
Presiding: J. V. Thompson, Chairman of the Board of Directors and Executive Committee
Consideration of Committee Reports and Resolutions
Final Report of By-Laws Committee—Foster Miles, Chairman
Final Report of Nominating Committee—Horace S. Felton, Chairman
Election and Installation of Officers
Presentation of "Hidden Power" Sales Training Program
Presiding: Joseph F. Battley, President
Introduction of Guest Speaker
"The Summit—The Dollar—The Market—The Future"
Leo Cherne, Executive Director
Research Institute of America
Unfinished Business
New Business
Adjournment

MEETINGS and FORUMS
All Meetings Will Be at Haddon Hall
unless otherwise stated

SUNDAY, OCTOBER 18

9:00 a.m.	Budget and Finance and Executive Committee Breakfast Meeting	Bakewell Room
12:30 p.m.	National Advisory Committee and Board of Directors Luncheon	West Room
2:00 p.m.	Budget and Finance and Executive Committee Meeting	Bakewell Room
2:00 p.m.	National Advisory Committee Meeting	Tower Room
4:30 p.m.	General Hospitality Committee Meeting	Sun Porch

MONDAY, OCTOBER 19

8:00 a.m.	Legislative Committee Breakfast	Bakewell Room
9:30 a.m.	Board of Directors Meeting	Mandarin Room
10:00 a.m.	Legislative Forum	Tower Room
10:00 a.m.	Advertising and Sales Promotion Managers' Forum	Viking Room
10:00 a.m.	Roof Coating and Roof Cement Manufacturers' Forum	Sun Porch
12:30 p.m.	Board of Directors Luncheon	West Room
2:30 p.m.	General Session	Vernon Room
6:30 p.m.	72nd Annual Reception	Carolina Room (Chalfonte)

TUESDAY, OCTOBER 20

9:00 a.m.	Putty, Glazing and Caulking Compound Manufacturers' Seminar	Rutland Room
10:00 a.m.	General Forum—Creative Selling	West Room
10:00 a.m.	Management Workshop Session (See Gen'l Session)	
12:30 p.m.	Men's Luncheon	Wedgewood Room
12:30 p.m.	Ladies' Luncheon	Trimble Hall (Hotel Claridge)
2:30 p.m.	General Forum—Keep it Legal	West Room
2:30 p.m.	Management Workshop Sessions (See Gen'l. Session)	
6:30 p.m.	Fifty Year Club Dinner	Rutland Room

WEDNESDAY, OCTOBER 21

8:00 a.m.	Naval Stores Breakfast	Tower Room
8:00 a.m.	Clean up-Paint up-Fix up Committee Breakfast	Bakewell Room
9:30 a.m.	General Session	Vernon Room
12:30 p.m.	Ladies' and Men's Luncheon	Wedgewood Room
12:30 p.m.	Luncheon and Organization Meeting Board of Directors and Executive Committee	Rutland Room
1:30 p.m.	Executive Committee Meeting	Rutland Room

HOWARD G. SCHOLL
President

Officers Federation of Paint and Varnish Production Clubs

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37th ANNUAL MEETING

RAYMOND C. ADAMS
President-Elect

EUGENE H. OTT
Treasurer

C. HOMER FLYNN
Executive Secretary

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THIS FILM WILL BE SHOWN AT 2 O'CLOCK P.M. AT THE TRAYMORE HOTEL, SUBMARINE ROOM, ON FRIDAY, OCTOBER 23, DURING THE PAINT CONVENTION IN ATLANTIC CITY
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Brilliant new polyester resins for

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5. They are easily pigmented.
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Water dispersible soya lecithin for aqueous pigmented dispersion. Gives good initial pigment dispersion, eliminates flocculation, inhibits hard settling of the pigment on storage.

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PROGRAM
37th FEDERATION ANNUAL MEETING

WEDNESDAY, OCTOBER 21

10:00 A.M. Joint meeting of the Program and Operations Committees. Club Representatives' Caucus.

1:30 P.M. Federation Council Meeting

THURSDAY, OCTOBER 22

9:30 A.M. Meeting Opens in Convention Hall.

10:00 A.M. "Efflorescence and Chalking on Painted Masonry Surfaces"—G. Allyn. (A Roon Award Competition Paper).

10:30 A.M. "Summary of Incentive Systems for the Paint Industry"—New York Club.

10:50 A.M. "Pigment Dispersion in the Szegvari Attritor"—C-D-I-C Club.

11:10 A.M. "Prediction of Critical Pigment Volume Concentration of Multicomponent Mixtures"—Philadelphia Club.

11:30 A.M. "Some Laboratory Techniques for Color Control in Production"—New York Club.

11:50 A.M. "Trail of the Fugitive Mahogany Varnish Stain"—Dr. L. D. Soff. (A Roon Award Competition Paper).

1:00 P.M. "The Influence of Cold Rolled Steel Surfaces on Paint Performance and Paint Testing"—G. W. Grossman, Jr. (A Roon Award Competition Paper).

1:20 P.M. "Driers Adsorption"—Philadelphia Club.

1:40 P.M. "Some Effects of Gamma Radiation on Vegetable Oils"—New York Club.

2:00 P.M. Address by Joseph F. Battley, President of the National Paint, Varnish and Lacquer Association.

2:20 P.M. "The Bratt Conductivity Cell for Measuring Chemical Resistance"—Northwestern Club.

2:40 P.M. "Studies Involving the Use of Various Fatty Acids in the High Polymer Technique for Alkyd Cooking"—Chicago Club.

3:00 P.M. "Evaporation Rate of Solvents: III; Use of the Automatic Recording Balance"—New York Club.

3:20 P.M. "Fire Retardant Paint Studies: IV; Use of Gas Phase Chromatograph in Burning of Paints"—Baltimore Club.

3:40 P.M. "Fire Retardant Paints"—A Panel Discussion.

FRIDAY, OCTOBER 23

9:00 A.M. "Magic of Fire"—A Safety Demonstration by the U. S. Bureau of Mines and Explosives.

10:30 A.M. Keynote Address by Herbert B. Woodman, President of Interchemical Corp.

11:00 A.M. The Annual Joseph J. Mattiello Memorial Lecture—"Exposure Studies of Organic Pigments in Paint Systems"—Vincent C. Vesce, Technical Director of Harmon Colors, National Aniline Division, Allied Chemical Corp.

SATURDAY, OCTOBER 24

Convention Hall

9:00 A.M. "Conventional Exterior Paints vs. Emulsion Exterior Paints"—A Panel Discussion.

10:15 A.M. "Powdered Insulating Finishes"—I. N. Elbling. (A Roon Award Competition Paper).

10:35 A.M. "Dispersions"—A Panel Discussion.

11:45 A.M. Installation of Federation Officers and Open Meeting.

1:00 P.M. Paint Research Institute paper on "Color Motivation" by Dr. R. Hefner, of the University of Michigan.

2:00 P.M. Paint Research Institute paper on "Adhesion" by Dr. J. S. Long, Executive Director of the Paint Research Institute.

3:00 P.M. 37th Annual Meeting closes.

SOCIAL EVENTS

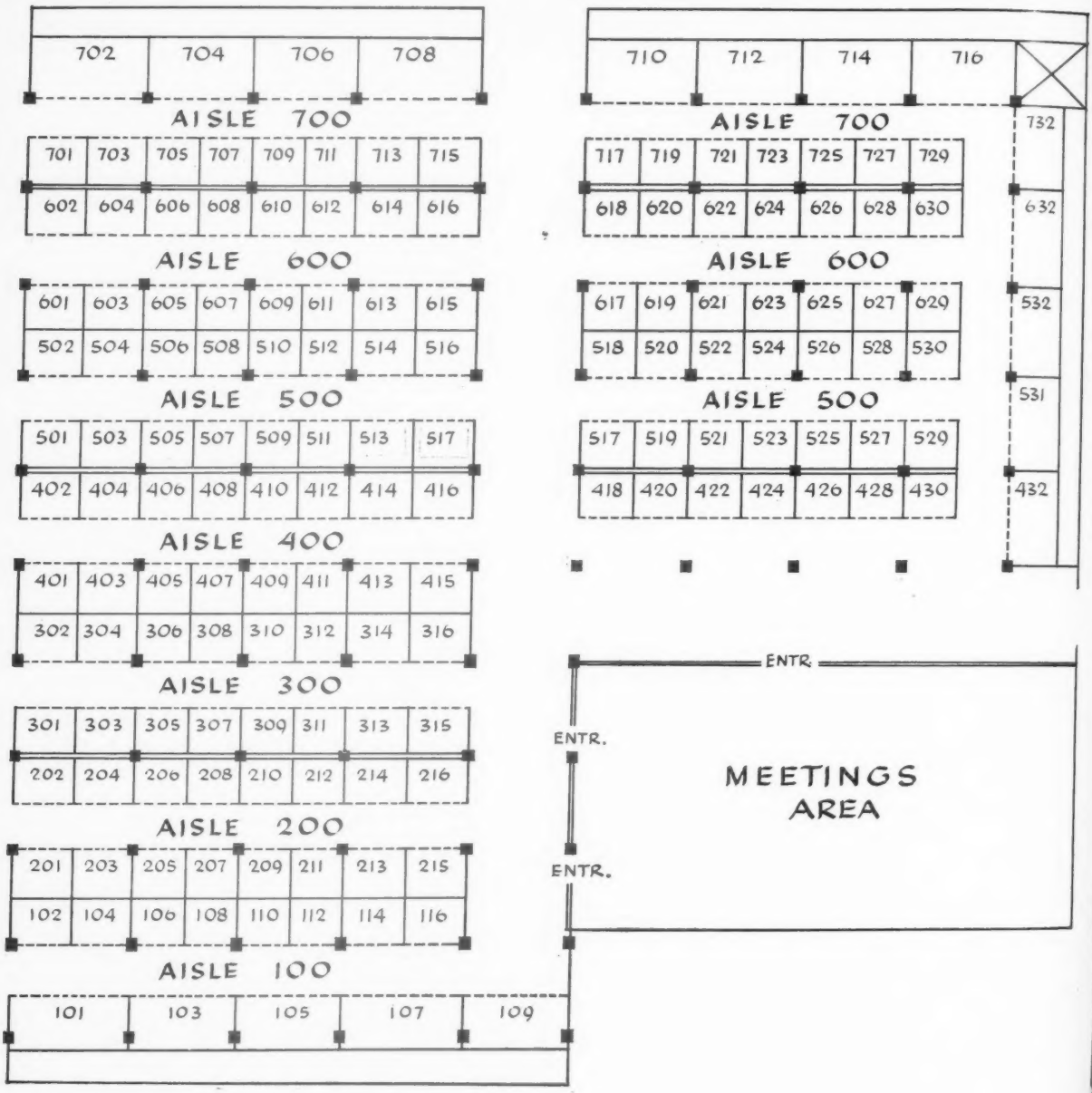
October 22—Trip to Renault Winery, Egg Harbon, N. J.—For Ladies

October 23—Brunch, followed by makeup and cosmetic demonstration. (Belvedere Room, Traymore)
Water Show. (Indoor Pool, Traymore)—For Ladies
Annual Banquet, Entertainment, and Dance at 7:COP.M.

REGISTRATION SCHEDULE

Wednesday	*Oct. 21*	*10:00 a.m. – 5:00 p.m.*	*Traymore Hotel*
		Noon – 5:00 p.m.	*Convention Hall*
Thursday	*Oct. 22*	*8:30 a.m. – 5:00 p.m.*	*Convention Hall*
Friday	*Oct. 23*	*8:30 a.m. – 5:00 p.m.*	*Convention Hall*
		8:30 a.m. – 12:30 p.m.	*Traymore Hotel*
Saturday	*Oct. 24*	*8:30 a.m. – 2:00 p.m.*	*Convention Hall*

FLOOR PLAN
1959 PAINT INDUSTRIES' SHOW



SHOW HOURS	
Wednesday, October 21	2:00 p.m. – 6:00 p.m.
Thursday, October 22	9:00 a.m. – 6:00 p.m.
Friday, October 23	1:00 p.m. – 5:00 p.m.
Saturday, October 24	9:00 a.m. – 3:00 p.m.

EXHIBITORS (A-Z)

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Williams, C.K. & Co. 517
Witco Chemical Co., Inc. 409-11

EXHIBITORS (Booths 101-732)

101	Chisholm Ryder Co.
102	Macbeth Daylighting Corp.
103	Cargill, Inc.
104	Kinetic Dispersion Corp.
105	Armour Chemical Division
106-08	Marbon Chemical Division
107	Rohm & Haas Co.
109	Lacquer Information Center
110	Johnson, S. C. & Son, Inc.
112	Q-Panel Co.
114	Kohnstamm, H. & Co.
116	Cellofilm Industries, Inc.
201-03	Commercial Solvents Corp.
202-04	Bennett Industries, Inc.
205	Thibaut & Walker Co.
206-08-10	Harshaw Chemical Co.
207	Air Reduction Chemical Co.
209-11	Olin Mathieson Chemical Corp.
212-14	Patterson Foundry & Machine Co.
213	Haynie Products, Inc.
215	Mineral Pigments Corp.
216	Ambrose, C. M., Co.
301	Interchemical Corp. Color & Chemicals Div.
302-04	U. S. Stoneware Co.
303-05	Metals Disintegrating Co., Inc.
306-08	Minerals & Chemicals Corp. of America
307	National Starch & Chemical Corp.
309-11	Imperial Color Chemical & Paper Corp.
310-12-14-16	Dow Chemical Co.
313	Cuno Engineering Corp.
315	Kent Machine Works, Inc. Allied Chemical Corp.
401-03	Nuodex Products Co., Inc.
402-04-06	Union Carbide Plastics Co.
405-07	du Pont de Nemours & Co., Inc. Elastomers Div.
408-10	Neville Chemical Co.
409-11	Witco Chemical Co., Inc.
412	Carbola Chemical Co., Inc.
413	Naftone, Inc.
414-16	Shell Oil Co.
415	Lehmann, J. M. Co., Inc.
418-20	Hercules Powder Co.
422-24-26	Goodyear Tire & Rubber Co. Chemical Div.
428-30	Advance Solvents & Chemical
432	Hockmeyer, Herman & Co.
501-03-05	Reichhold Chemicals, Inc.
502-04	Day, J. H., Co.
506	Carbon Dispersions, Inc.
507-09	Shawinigan Resins Corp.
508	Instrument Development Laboratories, Inc.
510-12	Eastman Chemical Products, Inc.
511	Johns-Manville Sales Corp.
513	Farnow, Inc.
514-16	Kellogg, Spencer & Sons, Inc.
515	Abbe, Paul O., Inc.
517	Williams, C. K., & Co.
518-20	General Electric Co.
519	Troy Chemical Co.
521	General Tire & Rubber Co.
522	Catalytic Combustion Corp.
523	Reichard Coulston, Inc.
524	Oronite Chemical Co.
525	Cambridge Industries Co.
526-28	Firestone Plastics Co.
527	Universal Color Corp.
529	General Aniline & Film Corp.
530	Ross & Rowe, Inc.
531	Amoco Chemicals Corp.
532	Gardner Laboratory, Inc.
601-03	National Aniline Div., Allied Chemical Corp.
602	Atlas Electric Devices Co.
604	International Talc Co., Inc.
605	Exposure Research, Inc.
606	Anderson-Prichard Oil Corp.
607	Shar Dispersion Equipment Co.
608	Davison Chemical Co.
609-11	Colton Chemical Co.
610	Raybo Chemical Co.
612-14-16	Ciba Products Corp.
613	Dow Corning Corp.
615	Washburn, T. F., Co.
617	Baker Castor Oil Co
618-20	Union Carbide Chemicals Co.
619	Velsicol Chemical Corp.
621-23	Dewey & Almy Chemical Co.
622	Pennsylvania Ind. Chem. Corp.
624-26-28-30	Celanese Corp. of America
625-27	Union Process Co.
629	Daniel Products Co.
632	Ross, Charles & Son Co., Inc.
702	Enjay Co., Inc.
701	Silberline Mfg. Co., Inc.
703	Capital Equipment Lessors
704	General Mills, Inc., Chem. Div.
705	Metalsalts Corp.
706	Cabot, Godfrey L., Inc.
707	Georgia Kaolin Co.
708-10	Morehouse-Cowles, Inc.
709	Color Corp. of America
711	Lawter Chemicals, Inc.
712-21-23	Shell Chemical Corp.
713-15	Monsanto Chemical Co.
714	Heyden Newport Chemical Corp.
716-32	Archer-Daniels-Midland Co.
717-19	Columbian Carbon Co.
725-27-29	Plastics & Coal Chemicals Div. Allied Chemical Corp.

EXHIBITORS' DIRECTORY

Booth No.

PAUL O. ABBÉ, INC. 515
Little Falls, N. J.
Ball and Pebble Mills and Mixers
Garlick, Kleinfeldt, Ringen, Philo, Wright, Sindle, Fuller, DuVall

ADVANCE SOLVENTS & CHEMICAL 428-30
Div of Carlisle Chemical Works, Inc.
New Brunswick, N. J.
Anti-Foaming Agents and Additives for Water Based Systems and Driers
Berger, Frankel, Gregg, Tucker, Moffitt, Binns

AIR REDUCTION CHEMICAL CO. 207
Div. of Air Reduction Co., Inc.
New York 17, N. Y.
Monomer in vinyl latex paints, Surfynol defoamers, Surfynol surface active agents, acetylenic alcohols, vinyl acetate, vinyl stearate, pigment dispersants,
Tinnon, Lehr, Schultz, Cole, Duffy, Herman, Schmalfuss, Gilarde, Healey

C. M. AMBROSE 216
Seattle, Wash.
Filling and Closing Machines, Self-Cleaning Strainer
Ambrose, Smith, Styba, McMackin, Passonno
— **See Advertisement Page 128** —

AMOCO CHEMICALS CORP. 531
Chicago 80, Ill.
Hydrocarbon resins, polybutenes in caulk and glazing compounds, trimellitic anhydride in water based and conventional alkyd baking and air dry finishes, trimellitic anhydride-polyurethance coatings
Parkinson, Amos, Eick, Bruggeman, Elliott, Rhoades, Connell, Perkins, Pearcy, Hubbard, Hoover, Watkins, Eiszner, Pighi, Cassis

ANDERSON-PRICHARD OIL CORP. 606
Oklahoma City, Okla.
Deodorized Petroleum Solvents
Gault, Rooney, Bettis, Johnson, Zimmermann, Rubek

ARCHER-DANIELS-MIDLAND COMPANY 716-32
Minneapolis, Minn.
Aroplaz 6006 (fast drying alkyd), Arolon 210 (exterior emulsion), Arolon 1000 (water-soluble resin for top coats), Arolon 304 (water soluble resin for primers), linseed oil panels
Representatives from all departments
— **See Advertisement Pages 8, 9** —

ARMOUR INDUSTRIAL CHEMICAL CO. 105
Chicago, Ill.
Fatty nitrogen chemicals as pigment dispersants, asphaltic paint emulsifiers, corrosion inhibitors, pigment grinding aids, latex stabilizers, fatty acids for architectural and industrial alkyds
Ward, Michals, DuBrow, Bierman

ATLAS ELECTRIC DEVICES CO. 602
Chicago 13, Ill.
XW-R Sunshine Arc Weather-Ometer
Norton, Alport
— **See Advertisement Page 131** —

BAKER CASTOR OIL CO. 617
Bayonne, N. J.
Castor oil in urethane finishes and approach to improving adhesion of emulsion paints
Hayes, Rulison, Hannemann, Jubanowsky, Reilly, Ehrlich, Bolley, Harrow, Stites, Patton, Smith
— **See Advertisement Page 136** —

BENNETT INDUSTRIES, INC. 202-04
Peotone, Ill.
Hi-Bake lined pails, unitized steel pail package, silk screened and lined steel drums
Bennett, Kuckie, LePan, Kapsa, Ernst

Booth No.

GODFREY L. CABOT, INC. 706
Boston 10, Mass.
Black Pearls (pelleted carbon blacks), Wollastonite (Cab-O-Lite) calcium silicate and Cab-O-Sil "airborne" colloidal silica
Berstein, Hall, McNeil, Virtue, Carpenter, Goulston, Parsons, Zoeller, Clark, Magno, Roemelt, Donohue, Marsh, Saladino

CAMBRIDGE INDUSTRIES CO. 525
Cambridge Mass.
Resinous plasticizers, gas chromatography liquid phases
Pockel, Stone

CAPITAL EQUIPMENT LESSORS 703
San Francisco, Calif.
Colorant Dispensing Machine
Stiles, O'Neill

CARBOLA CHEMICAL CO., INC. 412
Natural Bridge, N. Y.
Extender pigments in house paints
Koenig, Brown, Spriggs, Roast, Heikel

CARBON DISPERSIONS, INC. 506
Newark, N. J.
Carbon and lampblack dispersions
A. Brauch, Keegan, E. Brauch, Somers
— **See Advertisement Page 170** —

CARGILL, INC. 103
Minneapolis 15, Minn.
Linseed oil, soybean oils, fish oils, Alkyds, polyurethane vehicles, isophthalic—alkyd emulsion
Stanton, Shelby, Kamen, Martin, Knott, Schembri, Wiff, Donnelly, Rogaliner, Simmonds, Spitz, Klobe
— **See Advertisement Page 64** —

CATALYTIC COMBUSTION CORP. 522
Detroit 8, Mich.
Fume disposal systems for kettle cooking operations
Ruff, Goodell, Grimac, Tonkonogy

CELANESE CORP. OF AMERICA 624-26-28-30
New York, N. Y.
Monomers, polymers, emulsions, solvents, plasticizers
Kampschulte, Swanezy, Morton, Troy, Vona, Sinclair, Shea, Hecht, Schwabb, Lumley, Davis, Wyart, Jeydel, Koos, Cornwell, Jamison, Bartley, Melvin, Baker, Earle, Werner, Carroll, Marston, Norman, Ball, Smith, Bloom
— **See Advertisement Page 37** —

CELLOFILM INDUSTRIES, INC. 116
Wood-Ridge, N. J.
Techniques in bulk handling of nitrocellulose solutions, improved methods of packaging for drum shipments.
Golden, Eysmann, Bromley
— **See Advertisement Page 167** —

CHISHOLM RYDER CO. OF PENNSYLVANIA 101
Hanover, Pa.
Labeling machine, can casing machine, hand packer, filling machine
Abendschein, Severson, Roth

CIBA PRODUCTS CORP. 612-14-16
Fairlawn, N. J.
Epoxy Resins
Busker, Gruber, Pschorr, Robinson, Dorman, Senseman, Thompson, Johnson, Dodds, Joseph

COLOR CORP. OF AMERICA 709
Rockford, Ill.
Paint Colorant Dispensers
Baudhuin, Davis, Fonda, Holloway, Loken

Booth No.

COLTON CHEMICAL CO. 609-11
Div. of Air Reduction Co., Inc.
Cleveland 14, Ohio
Exposures of water-base paints made with Flexbond, new cross-linking emulsion for metal primers
Krashin Ames Jaffe Fickenscher
Newman Kaine Nelson Coff
Greenfield Werner

COLUMBIAN CARBON CO. 717-19
New York 17, N. Y.
Synthetic iron oxides (yellows, tans, reds, browns, and black), water dispersions of carbon blacks, base dispersions for nitrocellulose and acrylic lacquers, carbon blacks, lampblacks and bone blacks
Barnes Bryant Foster Mann
Berberian Buehrle Katona Seles
Bosworth Condron Kocik Stiff
Brannan Downs Loges Tudder
Venuto Weaver

— See Advertisement Page 72 —

COMMERCIAL SOLVENTS CORP. 201-03
New York 16, New York
Nitroparaffin Coatings Clinic
Luedeke Junker Erwin Palladino
Seifert Maple Mohrman McInnes
Hopkins Ombres Skelly Cooke
DiGiacomo Hallock

— See Advertisement Page 35 —

CUNO ENGINEERING CORP. 201-03
Meriden, Conn.
Mirco Klean fibre cartridge filter for use in paint manufacture and spraying
Grupe Palmer Munday
Towner Fuggett

DANIEL PRODUCTS CO. 629
Jersey City, N. J.
Specialty Dispersions, dispersing agents, anti-gelling agent
Daniel Cohen

DAVISON CHEMICAL DIV. 608
W. R. Grace Co.
Baltimore 3, Md.
Syloid silicas as flattening agents
Barrett Sybert Dexter Kunkowski
Symington Wilson

— See Advertisement Page 82 —

J. H. DAY CO. 502-04
Cincinnati 12, Ohio
Pony mixer, laboratory and production size Hy-R-Speed mill, high speed mixer (Daysolver)
Diltz Weil LeBond Wershay
Mader Harris Allison

DEWEY & ALMY CHEMICAL DIV. 621-23
W. R. Grace Co.
Cambridge 40, Mass.
New developments in vinyl acetate copolymer latices
Gibian Brookes Broughton Sale
Scheufele Morton Partrick Miner
Larson

DOW CHEMICAL CO. 310-16
Midland, Mich.
Latex developments for exterior wood house paints, industrial latex finishes, epoxy resins, vinyl resins, vinyl-toluene, granular Methocel, Dowicides, polyols, substituted phenols, methylene chloride Dowanol
Morand Peterson A. Drubel Haskell
Carpenter Huffman R. Drubel Keenan
Conant

— See Advertisements Pages 31, 33 —

DOW CORNING CORP. 613
Midland, Mich.
Silicone paints in military applications for maintenance paints and for industrial finishes, silicone intermediates
Wehrly Culbertson Schumack
Hedlund Meath Vidal

Booth No.

E. I. DU PONT DE NEMOURS & CO., INC. 405-07
Elastomers Chemicals Dept.
Wilmington 98, Del.
Coatings based on Neoprene and Hypalon synthetic rubbers and Hylene organic isocyanate
Kelly McSweeney Santora Remington

EASTMAN CHEMICAL PRODUCTS, INC. 510-12
Subsidiary of Eastman Kodak Co.
Kingsport, Tenn.
Cellulose acetate butyrate lacquer, sucrose acetate isobutyrate, isobutyl acetate
Moore Gearhart Johnston Ball
Crowley Abernathy Ryburn Isbell
Herring Atkins DeCroes Coney
Lee Shelly Cox Langston
Bonner

— See Advertisements Pages 10, 15 —

ENJAY CO. 702
New York, N. Y.
New Coating Resins, Solvents
Wickson Smith Toney Weinhold
Barrett Beddow Brooks Downes
Gallagher Howlett Mountain Kennedy
LaMotta Lyons Robbins

— See Advertisement Page 146 —

EXPOSURE RESEARCH, INC. 605
Miami 44, Fla.
Model Test Fences
Stopfer Brown

FARNOW, INC. 513
Long Island City 1, N. Y.
Cofar (latex emulsion) for high, medium and low PVC emulsion paints, Uneek (universal vehicle), tints and shades of Fafl paints, wrinkle vehicles and epoxy coatings
B. Farber Bauman Freund S. Farber
Shandler Saputo

— See Advertisement Page 130 —

FIRESTONE PLASTICS CO. 526-28
Chemical Sales Division
Pottstown, Pa.
Butaprene latex for interior and exterior applications, Exon vinyl chloride, solution resins and plastisols
Boyer Finkbiner Hills Johnston
Kellenberger Kuhn Litzinger Madden
Park Rosenson Stevens Thompson

GARDNER LABORATORY, INC. 532
Bethesda, Md.
Instruments for measuring gloss, reflectance, color, etc., laboratory instruments
Westgate Oelschlaeger
Gardner Cattaro

GENERAL ANILINE & FILM CORP. 529
Dyestuff & Chemical Div.
New York 14, N. Y.
Dispersed pigments, ultraviolet light absorbers, acetylene derivatives
Brouillard Wich Gannon Tator
Stevens Weth Woodward Day
Hamilton Dalton Underwood Katz

— See Advertisement Page 21 —

GENERAL ELECTRIC CO. 518-20
Pittsfield, Mass and Waterford, N. Y.
Methylon resins, silicone resins, masonry water repellents
Bzdulo Cahn Chase Darsie
Eber Goodwin Steenstrup Thompson
Winter

GENERAL MILLS, INC. 704
Kankakee, Ill.
Polyamide resins, curing agents, epoxy resins
de Meurisse Boyd Kron Ritell
Terry Wiegmann McNamara Edison
Lieby Hanson

Booth No.

GENERAL TIRE & RUBBER CO. 521
Chemical Div.
Akron 9, Ohio
Latex emulsion systems of styrene butadiene, styrene acrylic and graft systems for trade sales and industrial coatings
Hackim Phillips Boruff Vickery
Kreider Nathan
— See Advertisement Page 13 —

GEORGIA KAOLIN CO. 707
Elizabeth, N. J.
Hydrite (hydrated aluminum silicates) and Glomax (calcined aluminum silicates)
Larson Gans Lehman
Bollinger Compton

GOODYEAR TIRE & RUBBER CO. 422-26
Chemical Div.
Akron, Ohio
Pliolite S-5 and Pliolite VT resins in multicolor finishes, masonry paints, traffic paints and concrete floor enamels
Thies Workman McNeer Warner
Talley Mayfield Bear Gerrow
Hussey Kann Merritt Neese
Wallace Houlette
— See Advertisements Pages 14, 19 —

HARSHAW CHEMICAL CO. 206-10
Cleveland, Ohio
Driers, stearates, yellow and red cadmium lithopones, Sun Yellow C and N, organic pigments, Aurasperse color dispersions, and Kentucky inorganics
Coleman McGuire Rosemond Bonnie
Fritch Tucker Baldwin Hummel
Close Dickenson Harris Molinari
Stacey Straka Unkefer
— See Advertisement Page 66 —

HAYNIE PRODUCTS, INC. 213
Baltimore 30, Md.
Cold pressed, refined, kettle bodied, blown and double processed menhaden oils; isophthalic alkyd, fish and soya in extra long, long and medium oil lengths
Casey Davis Dempster DeSesa
Haynie Meade Rollins Scales
— See Advertisement Page 12 —

HERCULES POWDER CO. 418-20
Wilmington, Del.
Materials for modern surface coatings displaying film formers, synthetic resins, PE for alkyds and tall oil fatty acids
Representatives from all departments
— See Advertisements Pages 20, 139 —

HEYDEN NEWPORT CHEMICAL CORP. 714
New York, N. Y.
Pentek (Pentaerythritol), formaldehyde modified Pentek in alkyds, Pentek-glycols, data on alkyd emulsions
Barkley Brown Deakyne
Claypoole Kraft Robert
— See Advertisement Page 133 —

HERMAN HOCKMEYER AND CO. 432
Bronx 59, N. Y.
Various size units of "Disc Perser", heavy duty horizontal paste mixer
Klein Hockmeyer

IMPERIAL COLOR CHEMICAL & PAPER CORP. 309-11
Pigment Color Div.
Glens Falls, N. Y.
Line of pigments including fluorescent colors, Regal yellows, chrome greens Mercadium and cadmium colors, aqueous dispersions
Putnam Wakefield Sherman Cooper
LaBelle Mone Hallett Tickenor
Roach Mayo Tune Ray

INSTRUMENT DEVELOPMENT LABORATORIES, INC. 508
Attleboro, Mass.
Model "D" Color-Eye—combination tristimulus colorimeter and abridged spectrophotometer
Hall Johnson

Booth No.

INTERCHEMICAL CORP. 301
Color & Chemicals Div.
Hawthorne, N. J.
Five new pigments available in dry powder, press cake and dispersion forms
Craft Lynch Conklin Steiding
Wrigley Rost Remacle Viafora
Bittner
— See Advertisement Page 143 —

INTERNATIONAL TALC CO., INC. 604
New York 6, N. Y.
Asbestine Inert Pigments
Tuttle McCarthy Smart
Biggion Paterson

JOHNS-MANVILLE SALES CORP. 511
New York 16, N. Y.
Celite diatomaceous silica as pigment extender, processing aid and flatting agent
Kranich Shedko
— See Advertisement Page 52 —

DPA ENTERPRISE, S. C. JOHNSON & SON, INC. 110
Racine, Wis.
Diphenolic acid in heat curing water based coating. DPA polybasic acid derivative as alkyd modifiers
Bown Woodruff Smith

SPENCER KELLOGG AND SONS, INC. 514-16
Buffalo 5, N. Y.
Spenkel F77 (polyurethane coating) Kelsol 1209
Healy Beyer Farstad Smith
Bristol Ivancic Turve Bieneman
Kellogg Terrill Willis Bayer
Nagel Knittel Krueger James
Gould
— See Advertisement Page 22 —

KENT MACHINE WORKS 315
Brooklyn, N. Y.
Late Model Disperser
Peters DeSenna Latina

KINETIC DISPERSION CORP. 104
Buffalo, N. Y.
Kadyzolver and standard Kady mill
Kew Behrns Wheeler Callahan
Wallace Pluta

H. KOHNSTAMM & CO., INC. 114
New York 13, N. Y.
Line of pigment colors, non-toxic colors, Kodies universal concentrates
Coplan Dunn Kohnstamm
Olson Torter
— See Advertisement Page 126 —

LACQUER INFORMATION CENTER 109
Latest Developments in Lacquer Technology
Celanese Corp. of America — Columbian Carbon Co.
Enjay, Inc. — Hercules Powder Co.
Monsanto Chemical Co. — Sandoz, Inc.
Shell Chemical Corp. — Standard Ultramarine & Color Co.

LAWTER CHEMICALS, INC. 711
Chicago, Ill.
Fluorescent pigments, phenolic, maleic and specialty resins
Gifford Antonak Ferguson
— See Advertisement Page 39 —

J. M. LEHMANN CO., INC. 415
Lyndhurst, N. J.
Paint machinery, planetary mixer can coder
Ahlfeld Muller Hart Dittmann
Grale Crifasi Mierswa
— See Advertisement Page 127 —

MACBETH DAYLIGHTING CORP. 102
Newburgh, N. Y.
Lamp for meeting paint industry standard AAA-AA tolerances
Macbeth Moore Meeker Thompson

Booth No.

MAR[illegible]ON CHEMICAL DIV. 106-08
Borg-[illegible]arner Corp.
Washi[illegible]ton, W. Va.
Multic[illegible]or paints based on Marbon 11 TMV resin. Information of Marbon resins for colored aluminum paints, metal primers, maintenance paints.
Pratt Irvin Scott Mundinger
Watt Whitney McCurdy Smith
Kain Smythe

— See Advertisement Page 76 —

METALSALTS CORP. 705
Hawthorne, N. J.
Bactericide-fungicide additive in oleoresinous or aqueous systems, phenylmercuric additives
Weiss Grier Ramp Fallon

METALS DISINTEGRATING CO., INC. 303-05
Elizabeth, B, N. J.
Gold bronze powders, aluminum pastes, non-leafing aluminum pigments
Collins Sheaffer McKinley Town
Knoll Cliffe

— See Advertisement Page 144 —

MINERAL PIGMENTS CORP. 215
Muirkirk, Md.
Universal tinting vehicle and universal tinting systems made from "Jet Milled" and Predispersed Pigments
Scowe Devine Foos Weisberg
Robinson Stoltz

— See Advertisement Page 42 —

MINERALS & CHEMICALS CORP. OF AMERICA 306-08
Menlo Park, N. J.
Edgar ASP and Attapulgite Clay S
Blake Hempel Smith Wert
Lidon Wheeler Ferrigno

MONSANTO CHEMICAL CO. 713-15
Plastics Div.
Springfield, Mass.
Lytron 680 (Interpolymer Latex), styrene latices, surface coating resins
Jones Watt Gray Francis
Beers Brown Cochran MacPherson
Schmidt Green Gordon Moyer
Carney Hahn Wiese Dow
Bueker Parket Traverso Bridges
Herdan Casey Cohen

— See Advertisement Page 71 —

MOREHOUSE-COWLES, INC. 708-10
Los Angeles 65, Calif.
Variable speed dissolvers, redesigned mills
Missbach Klein Purcell Meyer
Grubbs Smoot Morehouse

NAFTONE, INC. 413
New York 22, N. Y.
Driers, Roskydal (Polyester) resins, driers for latex paints, tallates, anti-skinning agents, preservatives, Soy lecithin products, bases for PVAc, acrylic and butadiene-styrene systems
Applegate Lilla Smith McTavey

— See Advertisements Pages 87, 88 —

NATIONAL ANILINE DIV. 601-03
Allied Chemical Corp.
New York, N. Y.
Resin Chemicals—maleic anhydride, anti-skinning agents, fumaric acid, phthalic anhydride and other intermediates for alkyd resins; plasticizers, polyesters; curing agents for epoxy resins; solvents; Nacconol detergents (emulsifying agents for latex paints); Harmon Colors
Resin Chemicals–Faichney Tenbrack Mellion
Croce Keane Johnson Sandler
Oertel Seigle Draper Leary
Rhodes Berdell Wizemann Loughlin
Harmon Colors—Baker Barnes Bingham
Campbell Chartrand Cole Debes
Ely Hagens Madden Noon
Parker Saltzman Vesce Walker

— See Advertisement Page 148 —

Booth No.

NATIONAL STARCH AND CHEMICAL CORP. 307
New York 17, N. Y.
Vinyl acrylic latex, intumescent fire retardant coating formulation
Battaglia Burke Clay Greenwall
Klempner Liberti Meany Myers
Pierrehumbert Steed Thune Zahrndt

NEVILLE CHEMICAL CO. 408-10
Pittsburgh 25, Pa.
Coumarone-indene and petroleum hydrocarbon resins, aromatic solvents, Nevillac Hard, emulsifying resins
Craig Marsh Williams Villing
Wheeler Freeman Dauler Isenberg

— See Advertisement Front Cover —

NUODEX PRODUCTS CO. 401-03
Elizabeth, N. J.
Driers, fungicides, pigment dispersant, bodying agents, anti-skinning agents, mixing and milling aids, stearates aqueous additives, anti-foaming agent
Beyer Clark Dwyer Hanson
Houston Kaiser Minich Price
Ritter Schaeffer Seymour Stewart
Surano

OLIN MATHIESON CHEMICAL CORP. 209-11
New York, N. Y.
Solvents, nonionic surfactants, polyamide resins
Aston Barnes Hankins Hovey
Matarese McKinney McNeill Taliaferro
Russell Schray Malcolm

ORONITE CHEMICAL CO. 524
San Francisco 20, Calif.
Isophthalic acid and phthalic anhydride in alkyds and polyesters
Billings Bolens Burkel Colaianni
Gould Johnson Petersen Pollock
Schaefer Shea Stephenson Van Buskirk
Welton

— See Advertisement Page 18 —

PATTERSON FOUNDRY AND MACHINE CO. 212-14
East Liverpool, Ohio
Dispersion by ball and pebble mills, jar mills, mill jars, portable mixers, synthetic resin plant model, high density mill linings, grinding media
Jacobson Stephenson Lewis Hood
Witherow Kiernan Milburn Giuliani
Custis Gerster

— See Advertisement Page 3 —

PENNA. INDUSTRIAL CHEMICAL CORP. 622
Clairton, Pa.
Piccopale resins and emulsions, Piccotex (Styrene Copolymer), Piccolastic, Picco and Piccolyte resins.
Wilson Young Steinmark Smith
Paschal O'Rourke Henly Schuette
Flaig Hollis McCormley

— See Advertisement Page 129 —

PLASTICS AND COAL CHEMICAL DIV. 725-27-29
Allied Chemical Corp.
New York 6, N. Y.
Phthalic anhydride, plasticizers, Cumar resins, melamaine and alkyd copolymers
Cammann Miller DeVore Shand
Delaney Cislo Carney Boardman
Johnson McDonald Tufts Wyszynski
Yannason Pitcher Schmitt Stocker
Styles

THE Q-PANEL CO. 112
Cleveland 11, Ohio
Steel, aluminum and special alloy panels, phosphate-coated panels
G. Grossman P. Grossman Antonik

RAYBO CHEMICAL CO. 610
Huntington, W. Va.
Paint Additives
Hepner Conner

Booth No.

REICHARD-COULSTON, INC. 523
New York, N. Y.
Sunburst of color exhibit featuring synthetic red oxide pigments

Coulston Woodruff Treade Howe
Smith Burns Casey

REICHHOLD CHEMICALS, INC. 501-03-05
White Plains, N. Y,
Epoxy resins, thixotropic additives, acrylic solutions, polyesters, cyclized rubber, alkyd and acrylic emulsions, PVAc emulsion

Knauss Urich Weismann Drake
Pinkerman Penniman Rockenbach Wilson
Fay Baker Lauren Winmann
Spiegel Town Arnold Hughes
Sistino Carr Fisher Casale
Raswyck Zapch Bokenko Smiles

— See Advertisement 2nd Cover —

ROHM & HAAS CO. 107
Philadelphia 5, Pa.
Rhoplex AC-200 (thermosetting acrylic emulsion), Acryloid AT-50 (thermosetting acrylic solution), Rhoplex T-123 (acrylic emulsion), Acryloid resins in fluorescent coatings

Adamson Allyn Cheetham Collins
Elliott Evans Garrett Graeff
Gusman Harren Jaggard Klein
Lyons Oliver Prentiss Staines
Timmons Toussaint Urquhart Wetzel
Wight Wilkinson

— See Advertisement Page 81 —

CHARLES ROSS & SON CO., INC. 632
Brooklyn 5, N. Y.
Double planetary changeable can mixer, high speed disperser, improved High Speed three roll mills, laboratory and pilot scale mixers, grinders and dispersers

C. Ross R. Ross Teleky Muller

— See Advertisement Page 124 —

ROSS & ROWE, INC. 530
New York 7, N. Y.
Interface modifier, lecithin, viscosity modifier

Schlesinger Hilty McAuley Kruse

SHAR DISPERSION EQUIPMENT CO. 607
Fort Wayne, Ind.
Variable speed paint disperser

Schmitt Hoffman Rigel

SHAWINIGAN RESINS CORP. 507-09
Springfield, Mass.
Polyvinyl acetate emulsions and polyvinyl acetal resins in metal finishes and wood finishes

Bromley Finsilver Roth Poole
Terry Hoyt Porter Manning
Young Ash

— See Advertisement Page 23 —

SHELL CHEMICAL CORP. 712, 721-23
New York, N. Y.
Solvents and Intermediates, Epoxy Resins

Bazard Butler Carney Cosgrove
Curry McGuigan Murdock Norton
Bayes Dickerson Howard Jones
Neely Somerville White

— See Advertisement Page 6 —

SHELL OIL CO. 414-16
New York, N. Y.
Demonstration on viscosity characteristics of paint thinners

Preu Conn Erickson Waters
Ferrucci Reynolds Larson Carnahan
Day Gilbert Irwin Kingsbury
McHenry Niedermeier Pugh Sedlak
Sliwa

— See Advertisement Page 25 —

SILBERLINE MANUFACTURING CO. 701
Stamford, Conn.
Aluminum pigments for exterior coatings and industrial finishes

Scheller Usowski Smith

Booth No.

THIBAUT & WALKER CO. 205
Newark, N. J.
Vinylacryl 6-R-55, Vinyl acrylic emulsion, Government specification on oleoresinous finishes

Edelstein Sigafoose Parker
Stern Nortman Kaufmann

TROY CHEMICAL CO. 519
Newark, N. J.
New Body-Puffing Agent

E. Singer Goll Snyder Baker
W. Singer Withington Karner Sockloff
Nowak

— See Advertisement Page 174 —

UNION CARBIDE CHEMICALS CO. 618-20
New York 17, N. Y.
Cellosize hydroxyethyl cellulose, epoxide 201, vinyl acetate-2-ethylhexyl acrylate comonomers, intermediates and solvents for polyurethanes, lacquer solvents
Technical representatives and specialists

UNION CARBIDE PLASTICS CO. 402-04-06
New York, N. Y.
100 per cent solid coatings, vinyl solution resins, phenolic & epoxy varnishes, latices, epoxy varnish making resin technique using new experimental resin

Joiner Droman Ingram Weis
Eichalburg Fryman Shoemaker Bertics
Callas Martell Swain Goodard
Greenhood Gulick Kastner Kerr
Larson McCullough McKnight Richardson
Sullivan Westcott

— See Advertisements Pages 97-100 —

UNION PROCESS CO. 625-27
Akron 8, Ohio
Attritor fine-grinding equipment; production-size and laboratory-size units

Szegvari Long Selesnick Mason

U. S. STONEWARE 302-04
Akron, Ohio
Grinding and Mixing Equipment

Farkas Scales Gomol

— See Advertisement Page 119 —

UNIVERSAL COLOR CORP. 527
Oakland, Calif.
Color mixing system, dispensing machines

Muller Friedman Barth

VELSICOL CHEMICAL CORP. 619
Chicago 11, Ill.
Hydrocarbon resin emulsions and hard resins in specialty coatings

Burns Drake Lukas
Menke Schor Mayer

— See Advertisement Page 29 —

T. F. WASHBURN CO. 615
Chicago 14, Ill.
Thixotropic Vehicles

Balfour LuBien Winkler Neher
Smith Sklencar

C. K. WILLIAMS & CO. 517
East St. Louis, Ill.
Red, yellow, brown and black iron oxide pigments; green chromium pigments; fine ground umbers, sienas and natural red oxides

Burris Dentler Dubbeldeman Fuller
Green Hathaway Jeffrey Kroepel
Lippincott Mix Murray Nielson
Rambo Richards Wells

— See Advertisement Page 135 —

WITCO CHEMICAL CO., INC. 409-11
New York 17, N. Y.
Driers, plasticizers, carbon blacks, surface active agents, stearates, extender pigments, phthalic anhydride, driers for emulsion paints

Minnig Vaccaro Gardner Kearns
Marone Spielman Prewitt Reid
Tanner Hoehler Bunting Sucher
Huether Shaw

— See Advertisement Page 51 —

No.
205

519

18-20

04-06

25-27

02-04

527

619

615

517

09-11

UNION CARBIDE

UNION CARBIDE PLASTICS COMPANY ANNOUNCES

PROJECT SALESPOWER

PROJECT SALESPOWER...a program to increase your sales by improving your formulations through the introduction of new materials, new technical data, and new systems from laboratories of Union Carbide.

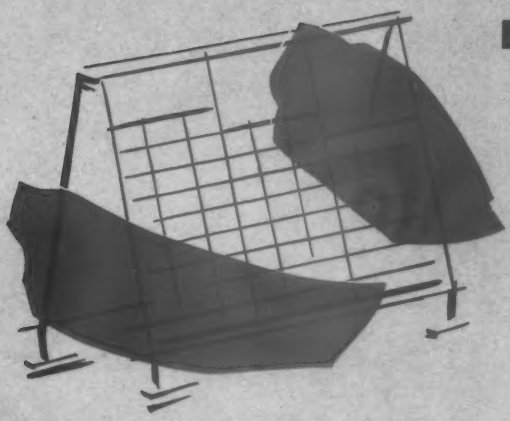
PLEASE TURN PAGE

WATCH the new developments

You'll find new markets, new techniques, new profits headed your

SEE the new things being done with epoxies and plastisols:

. . . the results of work with the spray technique of applying epoxy coatings.
. . . what's new in plastisols.
. . . the advantages of epoxy coatings using the "fluidized bed" method.



EXAMINE the remarkable properties of new vinyl solution coatings:

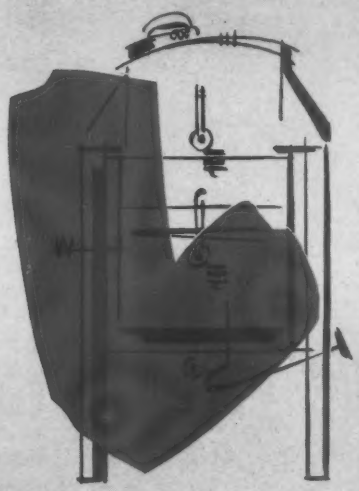
. . . a commercial exposure history of coated aluminum siding.
. . . the advantages of two new toluene-soluble vinyl resins.
. . . exposure test results of organosol coatings.

VISIT the UNION CARBIDE BOOTH

UNION CARBIDE and BAKELITE are registered trade marks of UCC.

ent from PROJECT SALESPOWER

ed yo way under this multi-purpose Union Carbide Plastics Company plan:



LOOK FOR the impressive new developments in varnishes:

. . . the new technique for cooking varnishes using liquid epoxies.

. . . the advantages of phenolic-based varnishes formulated by cold-mix.

. . . profit in the selling features of the newest varnish formulations.

HEAR about the big differences in vinyl latexes:

. . . WC-135 vinyl-latex for gloss and semi-gloss finishes.

. . . more about WC-130, the general-purpose, low-cost latex.

. . . the greater water-spot resistance, superior scrubbability and better pigment binding with a new vinyl-acrylic copolymer latex.

OTt the PAINT SHOW

See what's developing under the BAKELITE Brand. There's news about resins, techniques, formulations, and coatings applications—vehicles that can get you into bigger markets with a better product. And Project Salespower has just begun!

Don't miss it. The Paint Show—the Union Carbide Plastics Company Exhibit. Booths 402, 404, 406.

Frank Bertics
Technical Sales Representative

Alex Callas
Technical Sales Representative

Chuck Droman
Technical Sales Representative

Bob Eichelburg
Technical Sales Representative

Jim Fryman
Technical Sales Representative

Bruce Goddard
Group Leader, Development

Hank Greenhood
Market Manager

Rod Gulick
Group Leader, Development

John Ingram
Technical Sales Representative

Al Joiner
Technical Sales Representative

These are the men to give you the facts:

let them show you what PROJECT SALESPOWER is doing to help you build more business through a continuing flow of new developments in BAKELITE Brand Resins

Foster Kastner
Senior Chemist

Andy Kerr
New Products Market Development

Vern Larson
Region Manager

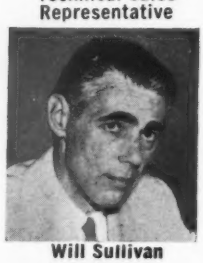
Bob Martell
Technical Sales Representative

Ken McCullough
Assistant Director Development

Bill McKnight
Group Leader, Development

Stan Richardson
Group Leader, Development

Stan Shoemaker
Technical Sales Representative



Will Sullivan
Development Associate

Bob Swain
Technical Sales Representative

Gerry Weis
Technical Sales Representative

Dick Westcott
Assistant Regional Manager

Talk to them at the 1959 Paint Industries Show Booths 402, 404, 406.

UNION CARBIDE

Union Carbide Plastics Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N.Y. *In Canada:* Union Carbide Canada Limited, Toronto 7.

ODORLESS MINERAL SPIRITS

SOLTROL*

DEPENDABLE SUPPLY!

When you deal with Phillips, a pioneer in the odorless thinner field and a leading producer of high quality odorless mineral spirits, you are assured of adequate supply. You can *rely on* Phillips prompt deliveries!

CONSISTENT UNIFORMITY!

Every precaution is taken to protect the excellent physical and chemical properties necessary to assure you of uniformly good results.

CONTROLLABLE DRYING TIME!

Use SOLTROL 130 for conventional drying characteristics, SOLTROL 170 for longer wet edge . . . or a combination of the two. Compartmented cars containing both SOLTROL 130 and SOLTROL 170 are available.

FREE SAMPLES!

We want you to test the SOLTROLS and see for yourself how they perform in your product. Send for your free samples of these high quality odorless mineral spirits today!

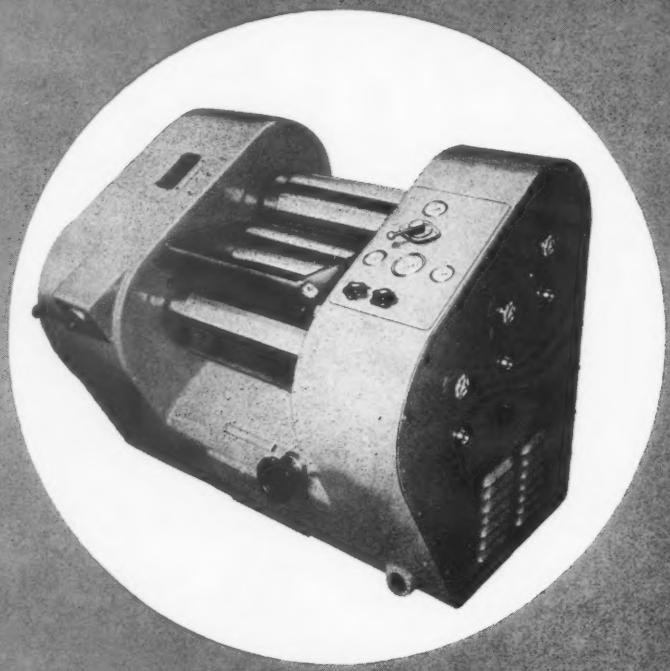
*A trademark

Also available in split cars

PHILLIPS PETROLEUM COMPANY
Special Products Division
Bartlesville, Oklahoma FEderal 6-6600

New fully hydraulic

BUHLER 3-Roll Mill



SDA
Roll Dimensions: 10" x 20"

SDT
Roll Dimensions: 16" x 32"
16" x 40"

• Up to 60% higher output

• Absolutely even pressures for uniformly fine grinding

1. New hydraulic regulating system provides absolute pressure stability and easiest (1 second) setting of rolls.
2. Determines exact pressure for any formula and duplicates it for that formula at any time.
3. Rolls disengage for cleaning in *1 second.* A simple hand-lever shift disengages rolls and scraper blade instantly. By shifting hand-lever back to operating position, rolls and scraper blade are restored to the exact pressure they were set at before disengaging.
4. New feed hopper arrangement increases working surface. Hopper cheeks do not rest on the roll, but are hydraulically pressed to the shoulder of the roll; permit grinding across the whole length of the roll, with even wear.
5. Hydraulically operated scraper blade maintains selected pressure irrespective of wear. Never loses pressure — hydraulic control takes up automatically to maintain exact selected pressure with wear.
6. Can be furnished with variable speed drive for the first roll, or driven by a 2- or 3-speed motor. Regulating the speed of the first roll for paints and inks of different consistencies increases the capacity 60% and more.

Write for full details.

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Erik Wulf, Glen Ellyn, Ill.

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24 KING STREET WEST
TORONTO 1, ONTARIO

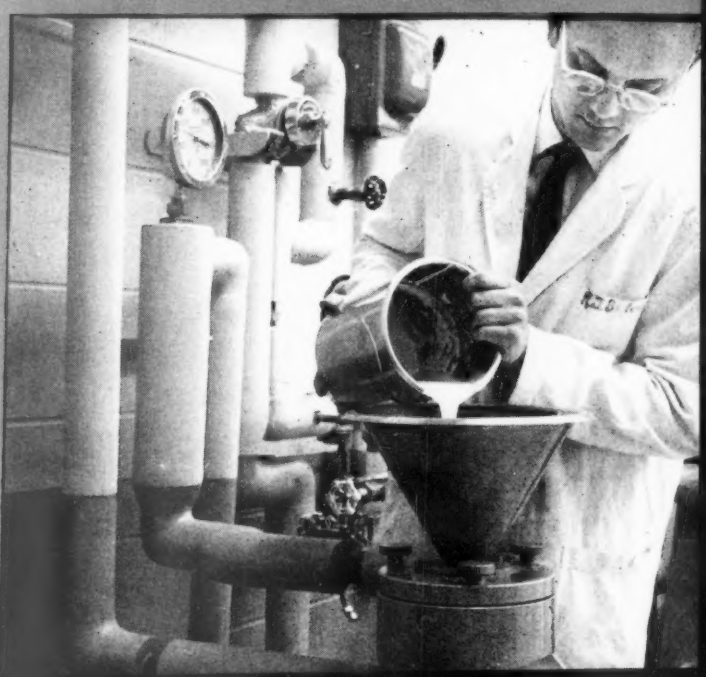
PRODUCTION

PACKAGING

MATERIAL HANDLING

NEW EQUIPMENT and MATERIALS

Depreciation, Deterioration, and Obsolescence are a part of any business. The constant evaluation of machinery for improving quality and increasing output is an important concern of the production manager. For an interesting discussion of obsolescence in paint manufacturing equipment, turn to page 105.



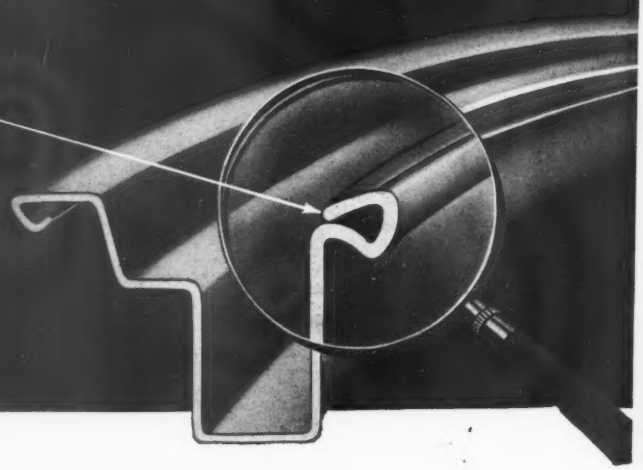
Announcing!

FEIN'S NEW "FLIPPED-TOP" RING

No raw metal edge of friction ring INSIDE can; paint touches only corrosion-proof lacquer lining! No rust! No discoloration!

Increased depth of ring and lid gives you 25% to 60% more security against air leakage!

True Triple-Tite closure seals off air in 3 places!



NOW...

Revolutionary New Can Design Removes Major Source of Rust... Provides 25% to 60% More Security Against Air Leakage!

FEIN'S NEW "FLIPPED-TOP" RING GIVES PVA AND LATEX BASE PAINTS LONGER SHELF LIFE!

It's here — another major triumph of Fein's research! Fein's eliminates previous shelf-life problems in the packaging of PVA and latex base paints. No more troublesome rust or corrosion in the can — because paint touches only non-oxidizing lacquer lining! No more air-caused deterioration or "skinning," because *3* friction seals provide protection! No more retailers' gripes . . . no more returns to cut down your profits! Write for full details and samples of this exciting new can development . . . today!

AVAILABLE IN 1 QT. AND 1 GAL. SIZES — EITHER LACQUER-LINED OR UNLINED.

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50th STREET & 1st AVENUE, BROOKLYN 32, N. Y. Telephone: STerling 8-2200

PHILADELPHIA AREA OFFICE: The Benson, Jenkintown, Pa. WAverly 4-5022
SALES OFFICES: Baltimore, Cleveland, Cincinnati, Boston, Columbus, Miami, Jacksonville, Chicago, Detroit, St. Louis, Philadelphia, Pittsburgh and Smith Can Company in Atlanta Georgia.
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DEPRECIATION DETERIORATION and OBSOLESCENCE

By
Lawrence Shatkin

IT is often said that obsolescence is much a state of mind as a physical measurement in business; a healthy dissatisfaction with doing things less well than they can be done. The distinct feature of a capital asset is that it begins to lose value continuously, and the businessman that can keep these costs to a minimum will have an edge over his competitor.

Depreciation

To understand depreciation clearly you have to answer the question: what factors cause values to decline? In answering this question it is important to recognize that depreciation involves two main influences. The first is deterioration, which relates to the physical wearing out of the item. The second is obsolescence, which refers to an item becoming obsolete because of new and improved equipment. Kester, in his advanced accounting textbook has drawn up a table classifying the causes of depreciation. (See Table I).

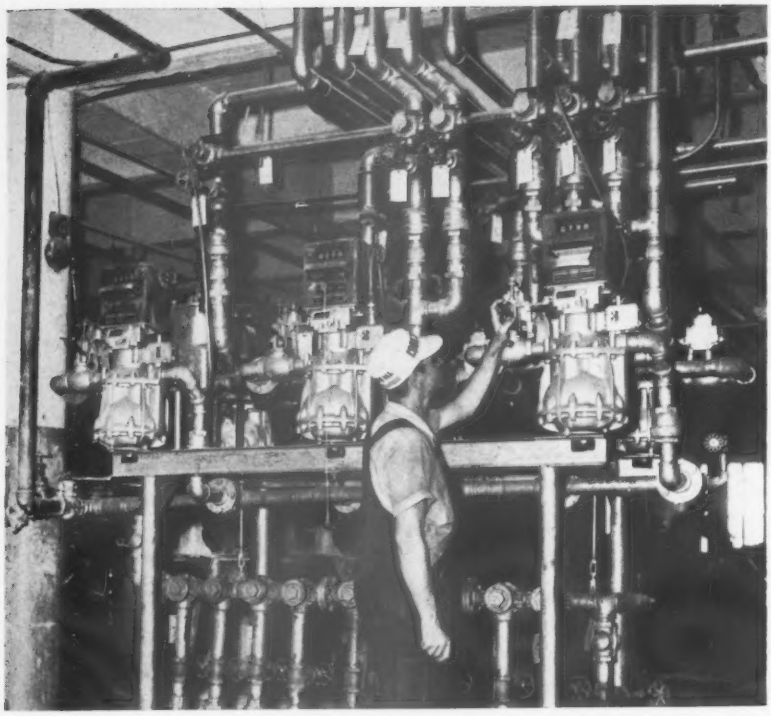
The Deterioration Factor

This phase of depreciation is the one regularly recognized in normal accounting practice. It is caused by such actions as wearing of the grinding media, vibration, heavy useage of machinery or parts, abrasion, etc. These effects are counteracted through replacement of parts, preventive maintenance and repairs, and repainting of surfaces. How well you implement the above procedures will determine the operating efficiency and useful life of the equipment. However, uncontrollable forces still make it necessary to replace ma-

Table I

- A. Tangible Property
  - I. Physical
    - 1. Wear and Tear from Operation
      - a. Maintenance Policy
    - 2. Decrepitude
      - a. Action of Time and the Elements
  - II. Functional
    - 1. Inadequacy or Supersession
    - 2. Obsolescence
  - III. Contingent
    - 1. Accidents
      - a. Negligence
      - b. Elements: Fire, Lightning, Wind, Water, Temperature
      - c. Structural Defects
    - 2. Diseases
      - a. Parasites
      - b. Pollution of Water
      - c. Growths in Water Mains: Mineral, Vegetable, Animal
      - d. Electrolysis
      - e. Crystallization
    - 3. Diminution of Supply
      - a. Natural Gas
      - b. Water
- B. Intangible Property—Rights
  - 1. Limited in Time
  - 2. Abandoned

The opinions expressed in this feature are not necessarily those of any particular firm or organization.



Modern liquid handling meters do away with manual blending operations, cut costs and insure blend uniformity.

Table II

Mill Charge—Chrome Yellow 250 grams
Med. Oil Alkyd 250 "
Mineral Spirits 22 "

Maroon Oxide 200 grams
Med. Oil Alkyd 300 "
Mineral Spirits 38 "

Zinc Yellow 300 grams
Med. Oil Alkyd 300 "
Mineral Spirits 38 "

Grind Readings (NS Guage)

	Chrome Yellow Light				Chrome Yellow Medium			
	A	B	C	D	A	B	C	D
5 Minutes	5¾	3	3½	3	6¼	2	3	3
10 "	6¼	4¼	4½	4	6¼	4½	4½	4½
15 "	6¼	5	5¼	4½	6½	4½	4½	5

	Maroon Oxides			Zinc Yellow				
	A	B	C	A	B	C	D	E
5 Minutes	6	4½	6¼	0	2	0	½	5
10 "	6¼	5	6¼	0	5	1½	2¼	5¼
15 "	6½	5	6½	0	5	2½	3	5½

Pigment studies using laboratory osterizer

chinery if the manufacturer is to remain competitive. Innovations bring about obsolescence—even overnight obsolescence.

Obsolescence

As is well known, obsolescence sets in very quickly in the fashion industry. A style in use today may be antiquated in tomorrow's market. It is not hard to find entire industries or regions where failure to modernize has brought about low earnings and distressed financial returns. A recent survey conducted by McGraw-Hill disclosed that within the chemical industry, paint manufacturers reported that two-thirds of their production capacity was built prior to December 1950. During the past ten years tremendous changes have taken place in the composition of paints. We have moved from the linseed, oleoresinous, and alkyd paints to latex paints, epoxies, urethane coatings, polyesters, and other polymeric coatings.

Latex Paints

The water based paints have given the industry a shot-in-the arm. The manufacture of such paints can be simple and profitable providing a company had the foresight to investigate this problem both from a formulating and manufacturing point of view. I have not come across a single piece of equipment that could be used efficiently for manufacturing all the different types of coatings on the market. A person manufacturing latex paints with equipment older than ten years is probably not operating at the optimum level of efficiency. With increased labor and material costs, it is necessary to reduce the manufacturing cycle.

The high speed dispersing machines permit the compounding of paints in one operation. This is practical for house paints, flats, semi-glosses, primers, and gloss paints. It has its limitations with colored pigments. However, many pigment producers are diverting their research toward this purpose.

Some preliminary investigations (in laboratory osterizer at high speed) on chrome yellows, zinc yellows, and iron oxides has shown some interesting results. (See Table II.)

The above results afford greater flexibility on the part of the manufacturer. Batches originally intended for the pebble mill can be shifted to the disperser machines.

Replacement Program

Undoubtedly, the two strongest reasons for making machine replacements are to increase productive capacity and to lower costs. Whether machines are replaced according to a definite program or only when some problem in connection with manufacturing arises, it is necessary to develop some plan of investigation. It is recommended that a check-list be set up by which to evaluate the present and proposed replacement machines from the standpoint of technical suitability and cost-saving features.

Technical Factors

The production manager will concern himself with the technical operating characteristics and limitations of the existing machines, and also conduct a survey to determine

Modern straining and filling processes with conveyorized labeling and packaging equipment increases plant efficiency.

what substitute equipment might be installed and what manufacturing advantages would accrue. He must decide whether the present equipment is worn out. It is obsolete? Is it inadequate from the standpoint of speed, accuracy, and output? Will a new machine have special advantages from the viewpoint of ease of set-up, convenience of operation, increased capacity, safety, and reliability?

Cost Factors

1. Is the cost of keeping the present equipment too high?
2. Will the cost of alterations be too great?
3. Will increased production be obtained?
4. How does maintenance costs compare?
5. How soon must the machine pay for itself to justify its purchase, especially if products change?
6. What space will be required?
7. Are funds available for this capital expenditure?
8. What is the life expectancy of the machine?
9. How will the purchase be written off?

Planning Machine Replacement

Even though a piece of equipment is still in good working order you may find it worthwhile to replace it with a newer model. Progressive companies have adopted plans of machine replacement according to definite programs. Each year a stipulated sum of money is budgeted for repairs and machinery. In the event there are unused funds, this can be added to the following year's allowance. Conversely, if the actual expenditure exceeds the budgeted figure, it may be necessary to curtail next year's allotment.

Certain financial conditions may limit the available funds for any given period. This requires that efforts be directed more heavily toward improved methods and procedures. After all, obsolescence can occur in terms of plant and equipment, and also within the framework of methods and processes.

The handling of paperwork has come in for increased attention, with startling results in many companies. Improvements have ranged from elaborated computer installations to simple consolidation of order, shipping and invoice forms.

The most important aspect of obsolescence is management; if management is progressive and competent, all other aspects will get the attention they need.

Electronic order-invoice machines provide up-to-minute analysis of inventory and sales.

WATER GROUND

MICA

ALSIBRONZ

EXTENDER PIGMENTS

for:

PRIMER-SEALERS

HOUSE PAINTS

LATEX-EMULSIONS

FRANKLIN MINERAL PRODUCTS

COMPANY

FRANKLIN, NORTH CAROLINA

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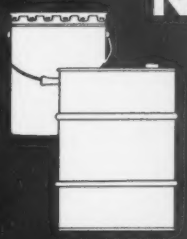
Agents in Principal Cities

For *Paint . . . Varnish . . . Lacquer . . . Resins . . . Thinners*

Now *all from one dependable source. Overnight Delivery*



Steel PAILS—DRUMS

5-WAY HI-BAKE LININGS

Write or phone for Prices, Samples

VULCAN STEEL CONTAINER CO.

Main Office and Factory

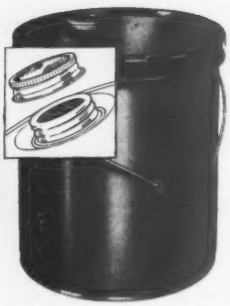
3315 35th AVE., N. | P. O. BOX 786 | BIRMINGHAM, ALABAMA

- Pail Sizes—1 through 13 gallons.
- Drum Sizes—13 through 65 gallons
- All styles—Open-Head, Closed-Head
- All popular Pouring and Filling Openings (UPressit caps and seals, screw caps with pull up spouts or Flex-spouts, as required.)
- Bolted or Lever Closures
- Meet all Standard Specifications
- Hi-Bake Protective Linings
- Lithographed, or your choice solid color exterior.

PAILS

Sturdy construction. Chimes completely coated. Corrosion resistant. Fine quality steel. Meet all standard specifications. (Furnished in all gauge steel as required).

Open-Head—Lug Covers



Open-Head with all popular pouring spouts. Hi-Bake lined or unlined.

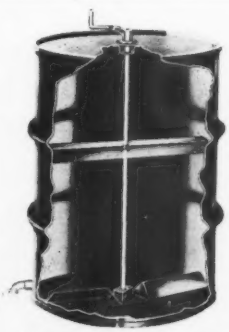
Drum-type Closed-Head. Top and bottom double-seamed. Side seams welded.

Drum type. Available with all popular pouring spouts. Offset at top for solid stacking.

Expert LITHOGRAPHING. Your Name, Trade Mark or sales message reproduced in non-mar, full range, perma-colors.

DRUMS

13-65 gallons, and special sizes. Accepted standards specifications. Closed-Head or Open-Head. Bolted or Lever closures. V-Shape rolling Hoops. 5-ply chimes. Fusion-welded seams. Hi-Bake Lining. Baked on finish, or custom painted and printed with brand name and sales message.



AGITATOR DRUMS

Single and Double Blade

FIRST CLASS
PERMIT NO. 3016
ST. LOUIS, MO.

BUSINESS REPLY MAIL
No postage stamp necessary if mailed in the United States

Postage will be paid by:

MONSANTO CHEMICAL COMPANY
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SEND REPLY CARD SEE HOW SANTOCEL® FR-C CAN CUT FLATTING COSTS AS MUCH AS 20% OR MORE IN CLEAR ACQUERS, VARNISHES AND COATINGS

(OVER)

Monsanto Chemical Company
Inorganic Chemicals Division

Gentlemen:

I would like to have a:

- ☐ test sample of SANTOCEL FR-C
- ☐ Monsanto representative contact me
- ☐ copy of the new SANTOCEL FR-C Technical Data Sheet

SANTOCEL FR-C:
The most efficient flatting agent you can use

Monsanto

*Name*_____ *Title*_____

*Company*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

For everything YOU need to start saving, fill in and mail this card

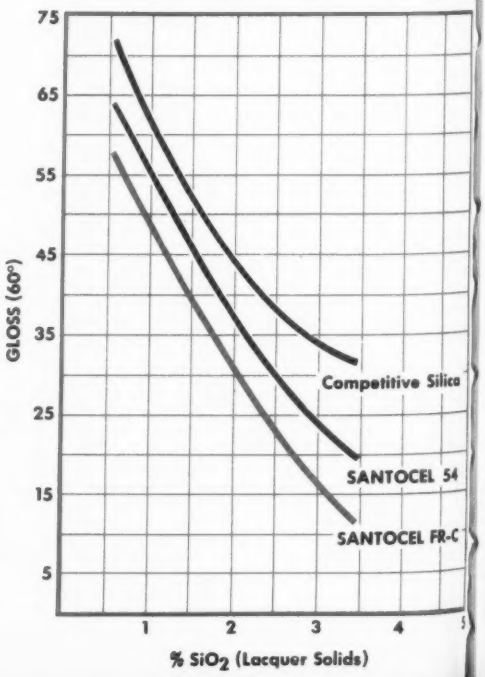
Here's proof of savings:

Compared to its SANTOCEL predecessors, you can use 10-20% less SANTOCEL FR-C—cut costs by an equal amount—and attain the same degree of flatting, from a matte finish to a semigloss.

If you are not using any SANTOCEL flatting agent now, you should *save even more* by replacing your present flatting agent with SANTOCEL FR-C, Monsanto's improved silica aerogel! It flats without clouding, gives clear hard films. Try SANTOCEL FR-C soon.

Effect of SiO_2 Content on Gloss

8-HOUR GRIND NITROCELLULOSE LACQUER



Controlling

ATMOSPHERIC EMISSIONS from PAINT and VARNISH OPERATIONS

Part II (Conclusion)

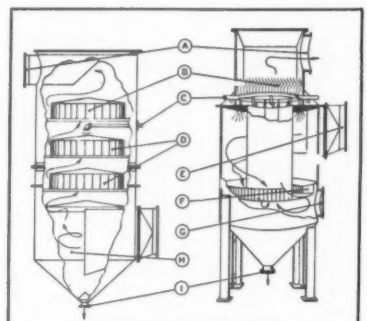
By

Robert L. Stenburg*

IN planning the installation of the fume disposal system, it is important to determine and correctly evaluate all the factors which form the basis for the proposed design. The daily production schedules, fuming rate of each particular batch and individual thinning procedures must be carefully analyzed to arrive at the condition of total maximum fume output. If several kettles are attached to one control unit, capacity should be sufficient to handle all of the fumes produced if maximum fuming occurs in all kettles simultaneously. Also, extra load capacity must be provided to handle such unexpected fume load as might occur from accidental overheating of a batch, sudden starting of an agitator, a sudden air blast while the batch is at high temperature or the charging of certain additions in large doses.

Liquid Scrubbing

Scrubbing effects a condensation and an absorption of the fume components. Therefore, intimate contact between the liquid phase and the gas phase is essential, and a liquid capable of readily absorbing or reacting with the fume components will be most effective. Various oils, solvents, acids and alkali washes have been tried on a limited basis but processes employing these materials are expensive and generally involve serious equipment maintenance and liquid waste disposal problems. Although water is not the ideal solvent for oil or resin fumes, it is the most commonly used fume scrubbing medium because it has proven relatively effective and is a low cost solvent. The addition of a wetting agent has been found to increase the effectiveness of water scrubbing.



Liquid Scrubber

Maintenance

The main disadvantage of spray chambers or towers employing nozzles for liquid atomization is the high maintenance required to keep spray nozzles working properly. Scrubbing chambers employing a series of baffles and water curtains require less maintenance. However, this method exposes less liquid surface to the gas stream than atomizing sprays. In both these types of scrubbers counterflow of the gas and water is usually employed. (Fig. 2.) Recirculation of scrubbing media is required where acid, alkali or solvent washes are used. Present practice with water washing is away from recirculation. In considering liquid scrubbing as a possible fume control method, the liquid waste disposal problem should be thoroughly investigated before a final selection is made. Packed towers have not been commonly used for fume control because the tarry and gummy nature of the condensed fumes soon fills the spaces between the packings.

Selheimer (12) reports overall collection efficiencies ranging from 85 to 98% for a multi-stage impinger type water scrubber with turbine-like vanes when used to scrub fumes from several oil and varnish cooking processes.

*Senior Sanitary Engineer, Engineering Research & Development, Community Air Pollution Program.

Part I appeared in the September issue.

Incineration

Disposal of fumes from the cooking of oils and resins by combustion is perhaps the most effective single method of removing all forms of the heterogeneous fume mixture previously mentioned. Except for a certain amount of water, the fumes are mostly organic in composition and are therefor fully combustible. If complete oxidation of the hydrocarbons to H_20 and $C0_2$ can be achieved, many, if not all, of the obnoxious and odorous materials will be converted to innocuous compounds which are considered normal constituents of the atmosphere.

temperatures required for complete combustion may also vary during a cycle. Temperatures in a direct flame burner, generally range from 1100 to 1200° F., although temperatures up to 1500°F. have been required at times (Table 4). As a general rule, ignition temperatures become higher with an increase in water vapor and $C0_2$ content of fumes. Sufficient oxygen must be available for complete combustion, and the gas stream must be maintained at temperature long enough for the reaction to go to completion.

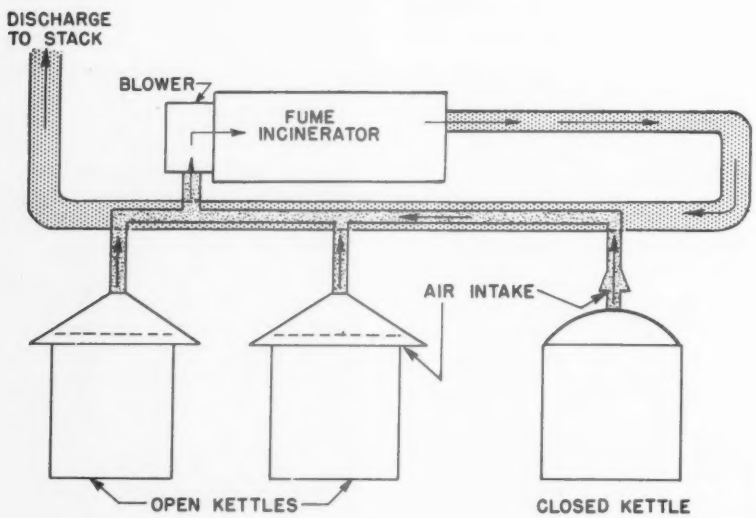
There is some evidence gained from field observations to indicate that low concentrations of organic waste materials passed through live flames undergo complete oxidation more readily than when raised indirectly to the combustion temperature. Studies are presently under way by the U. S. Bureau of Mines on certain pure compounds to determine the validity of this observation.

Table IV

FUME IGNITION TEMPERATURES
From Jares (1)

Materials	Degrees F.
Linseed oil (raw)	1,150
Linseed oil (refined)	1,130
Linseed and fish oils (50-50 mixture)	1,140
Z-3 linseed and Z-3 castor oils (50-50 mixture)	1,120
Alkyd—tall oil—pentaerythritol	1,280
Varnish formulations	980 to 1,160

Fume ignition temperatures.



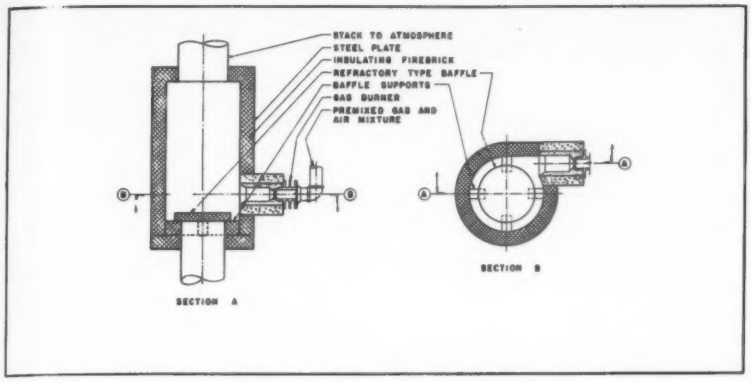
Layout of fume combustion system for paint and varnish cooking.

Fumes having a given chemical composition will have characteristic ignition or combustion temperatures, but this composition (like the kettle temperature and fuming rate) may change as the cooking cycle progresses. Therefore, the

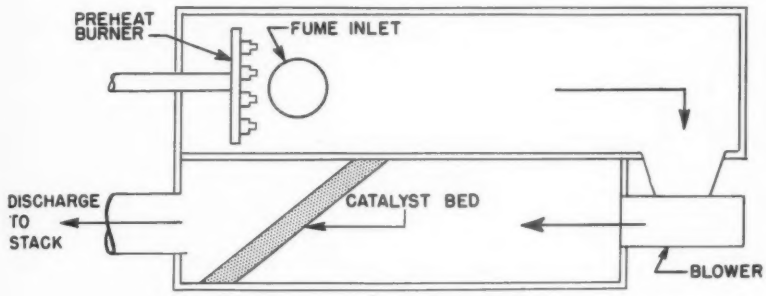
A complete system of fume disposal by combustion consists of kettle covers, a main fume duct with branch lines to the individual kettles, and a fume-burning furnace consisting of a gas or oil-fired fume-ignition zone and a fume combustion zone (Fig. 3.). This latter zone is provided with additional radiating surfaces to insure complete combustion of slow-burning or wet fumes. An exhaust system utilizing a natural draft type chimney, an exhaust blower or an ejector system is required to convey the fume-air mixture from the kettles through the furnace and release the spent flue gases into the atmosphere.

Fuel consumption of a fume incinerator depends on design, rated fume capacity and draft conditions of the system. A correctly proportioned and well insulated furnace (Fig. 4.) requires a fuel input between 600 and 1200 BTU per hour per gallon of processed batch. During the maximum fuming rate of the cooking cycle in certain processes, enough fumes will be produced to appreciably supplement the regular fuel. In such cases, a temperature controller is used to restrict fuel input and the heat generated by combustion of the fumes helps maintain the furnace at the required temperature. Fuel savings up to 80 percent of the rated burner capacity have been reported by Jares (1).

In using combustion processes for disposing of fumes, adequate consideration must be given to the possibility of fire or explosion in the kettle as a result of flashback through the vapor or by ignition of condensed duct deposits. Insurance underwriters will disapprove fume control by combustion on particularly hazardous processes, and will require that adequate flashback or burnback precautions be included on those installations approved for incineration. These may be achieved by diluting the fume concentration to less than 25% of the lower explosive limit and by maintaining gas velocities in the fume ducts well in excess of 20ft. per second, the rate at which flame could propagate along the duct.



Waste gas and odor incinerator.



Classification for causes of depreciation.

Catalytic Combustion

Catalytic combustion is gaining wider acceptance as an effective method of fume disposal as more suitable catalysts are developed and as more effective reduction of odorous fume components is required. The catalytic combustion unit differs from the direct flame incinerator only by the addition of a catalyst bed which serves the function of reducing the autoignition temperature of the fumes (Fig. 5.). As a result the catalytic unit operates at a lower temperature.

The most effective catalysts are vanadium and platinum compounds. Catalytic media are usually made with a thin coat of the catalyst covering asbestos strips or porcelain, refractory, or nickel alloy rods. They are designed to produce high surface area and employ various shapes and bed arrangements in order to obtain intimate contact of the fumes with the catalyst surface. Combustion occurs on the surface of the media. The heat is liberated to the exhaust stream. When fume concentrations are too low to allow flame propagation, there is normally no visible evidence of combustion, but where fume concentrations are sufficiently high, the heat of combustion will cause the catalyst to come to a dull red color.

In order to oxidize fumes in the presence of a catalyst the entire gas stream must be raised to a temperature ranging from 500° to 600°F. If the exothermic heat of reaction is insufficient to maintain such temperatures, the gases must be preheated before entering the catalyst bed. The complete oxidation of some malodorous components often requires preheating of the gas stream up to 1000°F.

For safety purposes the catalytic combustion unit requires the same dilution of the fume stream as the non-catalytic incinerator.

Some combustion processes are being installed with the duct between kettles and incinerator enclosed inside the flue carrying incinerator flue gases to the outside atmosphere. This arrangement provides a heated duct for transporting fumes from the kettles and eliminates clogging of ducts from fume condensation.

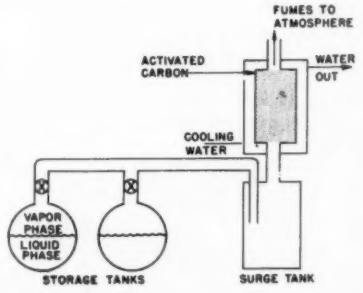
Disperal by Tall Stacks

Disposal of cooking fumes by discharging through tall stacks for atmospheric dispersion without preliminary control devices has been practiced in the past, but the method has several disadvantages and is seldom considered a satisfactory solution under present day requirements. On processes other than high temperature cooking, stack dispersion of small amounts of gases and vapors which are not too objectionable may be justified in localities where favorable winds blow continuously through the year.

The use of tall stacks is considered advisable, however, for discharging exhaust gases from both scrubbing and combustion control devices into the atmosphere.

Adsorption

The gummy composition of condensed cooking fumes makes the use of adsorbents such as activated charcoal impractical as the primary control device on kettles. However, for certain difficult odor problems adsorption is a highly effective control measure, particularly where small volumes of gases containing high odor intensity materials must be treated. With the development of new processes and the use of new materials, activated carbon may be expected to find even wider usage. Its use in controlling methyl methacrylate vapor released from storage tanks and tank trucks has already been mentioned (Fig. 6.).



Venting liquid storage tanks through activated carbon adsorption cartridge.

Adequate safety precautions must be observed in the use of adsorbents since an appreciable heat of adsorption is developed which could cause ignition of the vapors. This heat can be kept at safe levels by cooling the activated carbon cartridge and by regulating the rate at which the vapor is released to the adsorbent.

Other Methods

Although control devices will normally be required for reducing the major sources of atmospheric pollution, other possibilities for effecting a reduction in pollutants should be thoroughly investigated to insure the most practical and economical solution. The substitution of raw materials with less odor-causing impurities or fewer objectionable decomposition products may sometimes be possible without seriously altering the basic properties of the vehicle being produced. The refinement of tall oil to remove sulfur is an example of what can be accomplished along these lines. Minor process modifications or changes may be effective in reducing the discharge of odorous or irritating components accompanying normal fuming. These may include rate of heat application, maximum temperature of cook, or length of time kettle is held at maximum temperature. It has already been noted that the release of H_2S from the cooking of tall oil increases with temperature.

A detailed survey of the raw materials used, the storage and handling facilities and the processes employed throughout the plant may suggest other ways of reducing the overall contribution to atmospheric pollution. In considering the manufacture of new products, the air pollution potential of the raw materials to be used and the new processes to be employed should be thoroughly evaluated under production conditions.

Individual plant and group research similar to the study (4) sponsored by the Chicago paint and varnish manufacturers will be of great value in solving specific problems and reducing the cost of air pollution control. Although fumes have heretofore been considered uneconomical to recover, the added cost of pollution control may eventually make their recovery more feasible economically.

The establishment of industrial zoning areas designated by air pollution control agencies on the basis of favorable movement of atmospheric air masses away from centers of population, may sometimes require less stringent controls on fume emission from plants located in such areas. However, this approach to air pollution control can only be put into effect after suitable study to determine if such zoning is feasible.

Air pollution problems associated with the manufacture of protective coatings result primarily from the high temperature processing of natural and synthetic oils and resins to produce paint and varnish vehicles. The release of malodorous materials is the most widespread problem and the most difficult to control. Since fume components are predominantly of hydrocarbon composition, they have the potential to contribute to the formation of smog in those areas where air pollution is well established. Property damage is also a definite possibility.

The majority of fumes from cooking processes may be controlled by liquid scrubbing or by incineration, the latter being more effective in reducing the small but offensive portion of the total fume output that is largely responsible for the odor problem. Activated carbon adsorption is effective on certain highly odorous materials on processes other than cooking.

These and other types of controls are in general usage throughout the industry and are serving to greatly reduce the amount of undersirable materials discharged to the atmosphere.

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New Developments

Naftone Announces Polyesters for Coatings

A group of polyester resins (trade name Roskydol), manufactured by Farbenfabriken Bayer, A. G. is now being made available in this country by Naftone, Inc. These resins are unsaturated wax-free type polyesters, which will cure either at room temperature or by baking. They can be formulated for clear or pigmented coatings and will give, upon complete curing, high gloss, mar, abrasion, acid and light resistant films. Such coatings can be adapted for spray, or flow coater application and applied to wood, Masonite, chip board, masonry or metal surfaces. Nine types of Roskydals, ranging in film properties, are available. Among these are Roskydol 500, 500-B, 530, 540, and 550. All types are completely compatible and can be combined by the formulator to obtain certain specific properties. A starting formulation for clear coatings using these polyester resins is as follows:

100	Parts	Roskydal
40	"	Monostyrene
2	"	Coconut oil modified, non-drying alkyd, 50% in toluol.
2	"	Silicone Oil, Bayer PL, 1% Solution in Toluol
0.3	"	Cobalt Naphthenate 6% Metal in Toluol
5.6	"	Cyclohexanone Peroxide, 50% in Plasticizer

Pot life of the formulation before gelation is about 15 minutes after adding the peroxide. However, this can be extended in a practical, commercial manner by two methods.

1 - Replace the 5.6 parts of cyclohexanone peroxide 50% with 4 parts of cumene hydroperoxide 70%. This will give working day life and depending on atmospheric temperature, it may last five days before it gels. Trials must be made to determine the gel time at a given temperature with each individual formula. When cumene hydroperoxide is used, Roskydal will not room-temperature cure. It must be heated to 130°F at which temperature, cure takes about 30 minutes. Cure is accomplished in less than five minutes at 275°F.

2 - The active ground-coat method is very practical. In this case, the peroxide is carried in a lacquer sealer by the following formula: -

100	parts	½ second Nitrocellulose, 20% in ethyl acetate
16	"	Cyclohexanone Peroxide, 50% in plasticizer
34	"	Butyl Acetate
50	"	Toluol

This can be applied directly to prepared wood or over a polyurethane sealer at the rate of 20 grams per square foot. After curing for two hours, the above Roskydal clear formula(*) is applied in any thickness up to 8 mils wet coating. This system will cure at room temperature in about six hours, depending on temperature.

Stains may inhibit the polymerization of the polyester. A sealer based on isocyanate has been found helpful to protect the top coat from harmful substances in the wood. Suggested formulation for this two component sealer is as follows:

20.	Parts	Multron R4, 50% in Butyl Acetate
20	"	Coconut oil modified non-drying alkyd, 50% in toluol
11	"	Methyl Glycol Acetate
4	"	Ethyl Glycol Acetate
7	"	Xylene
11	"	Butyl Acetate
1	"	Dibutyl Phthalate
23.5	"	Mondur CB 75%

Pot life is equal to working day. This sealer can only be used on stained or dark woods as one will experience discoloration of the sealer on bleached or light stained wood. This sealer can be applied by a cloth, cured for two hours at room temperature, lightly sanded, and then the polyester top coat can be applied. In spraying, it is recommended that the sealer be dried over night, slightly sanded, and top coat applied. The isocyanates used in the above formulations are completely blocked and pose no health hazard to the applicator.

Formulations in which the filler is completely compatible with the Roskydal top coat are available.

Thixotropy can be imparted to Roskydal polyester by adding Cab-O-Sil H5. This is important for spraying vertical surfaces. For obtaining higher viscosities, a portion of the monostyrene can be withheld. High thixotropy will give poor flow despite the use of silicone oil. Increased flow can be obtained by reducing Cab-O-Sil but then thick films cannot be applied in one application.

Flattening of the cured polyester film can be accomplished by using Syloid 162 or Syloid 244, according to Naftone. The ratio of Syloid to Roskydal should be 10:100 parts

Pigments can accelerate or inhibit the curing of the polyester film. Delay of curing may occur by absorption of cobalt naphthenate by the pigment. Here is a partial list of pigments which can be used:

TiO_2 rutile non-chalking
Lithopone 30 used in spray applications to prevent floculation
Carbon black FWI—Degussa or equivalent
Iron oxide red 140F—Bayer or equivalent
Cadmium reds, chemically pure—Bayer BB or GG or equivalent
Toluidene red
Manganese blue
Phthalocyanine blue
Ultramarine blue

Note: (*) Excluding the peroxide.

Chrome oxide green
Phthalocyanine green
Iron oxide yellow—Bayer 420W or equivalent
Chrome yellow
Cadmium yellow
Hansa yellow

The formulator should check the compatibility of the pigments before using. This can be done by making up a basic formulation leaving out peroxide. To this formulation after storage add peroxide then curing can be checked in comparison with regular clear formulations

Carbon black and organic pigments should be used in the ratio of 1:3 parts per 100 parts of polyester. 25/100 pigment/polyester is the correct ratio for inorganic pigments. Basic pigments are not recommended for use in Roskydal coatings.

Suggested industrial application of coatings formulated with Roskydal polyesters resins include: furniture finishes, marine finishes, synthetic tile board, kitchen cabinet finishes, metal finishes, etc.

For complete details concerning these polyester resins write to Naftone, Inc., 425 Park Ave., New York 22, N. Y.

•

Filter Cartridge

American Felt Co. has announced the introduction of a new filter cartridge. The new filter cartridge line, reportedly assures true micron precision vitally needed in the chemical process industry.

The new cartridge is said to offer the following advantages: space savings for new or revised installations and high solids capacity.

Filtering action takes place through the media bed. It makes full use of "edgewise filtration." Operation of filtration equipment at lower pressure drops.

The cartridge consists of an aluminum core and viscose fiber "Feutron" filter media. This is said to provide a wide range involving aqueous, oil and solvent applications. The fiber discs are locked in place around the perforated core by end retaining rings and encased in stockinette for ease of handling. The edges of these discs are scalloped to give maximum filtering action.

Advantages of this filter cartridge were translated in terms of increased production. Two paint men chose to measure "Feutron" cartridge value in those terms. One, using a 50-micron filter cartridge said he increased the filtering capacity of his equipment from 100 to 300 gallons. Longer life was noted in that this cartridge was capable of longer use—an increase from 1,000 to 2,000 gallons.

Another example of the adaptability of these cartridges is the result of an experiment of one of the leading paint manufacturers. He needed paint to meet a specific requirement—that of providing a satisfactory surface for "chalkboards" which are replacing blackboards in new schoolrooms. He had evaluated various types of wool and hair felt but none had come up to his requirements. Samples of "Feutron" synthetic fiber felt more nearly met his needs.

•

Zinc Oxide Properties Added to Latex Paints

A new latex resin that is compatible with zinc oxide has just been made available to paint formulators by National Starch and Chemical Corp., New York City. Designated Resyn(R) 25-2243 by the manufacturer, the new compound permits the utilization of zinc oxide to add many of the desirable properties of this pigment in paints. In addition, the new resin offers package stability, until now a problem area when combining zinc oxide with latex formulations.

National Starch developed the resin—a latex, polyvinyl-acrylic copolymer, and in cooperation with American Zinc Institute, Inc., developed the formulations containing zinc oxide. Together with the members of AZI's Pigments Committee, they jointly evaluated the properties of the new resin as well as paints formulated with it. Studies includes independent stability evaluations by six laboratories, and test results show that zinc oxide can be used successfully with the new resin in latex paints.

Zinc oxide has been used by paint formulators for many years because of the desirable properties it contributes to exterior paint films such as opacity to ultra-violet light, good cleansing, color retention, and mildew resistance. Zinc oxide has long been known to contribute these and other desirable properties whether the paint binder is oil, alkyd resin, styrene-butadiene, polyvinyl acetate, acrylic or other organic material, and regardless of whether the film is formed from a solvent, water dispersion, emulsion, or a solution. However, until National Starch embarked on the research efforts which resulted in the new resin, latex paint formulators were reluctant to include zinc oxide in their formulations because they feared that the reactive pigment would decrease package stability, an objection that has been resolved by the new resin.

As part of the evaluation tests, extensive series of both white and tinted exterior latex paints prepared with the new resin and zinc oxide have been applied to various substrates including asbestos-cement shingles, stucco, cedar shingles, cedar siding, yellow pine siding and chalking house paint. Exposures were made in June of 1959 at nine locations in the United States.

While it is too soon to draw conclusions regarding ultimate service, the package properties and application characteristics of the zinc oxide-containing latex paints have proven entirely satisfactory. Final results of the exposure tests will provide information regarding optimum pigment volume concentration, zinc oxide level, and detailed formulation data.

(*For more New Developments turn to page 134.*)

Look what has happened to JAR MILLS!

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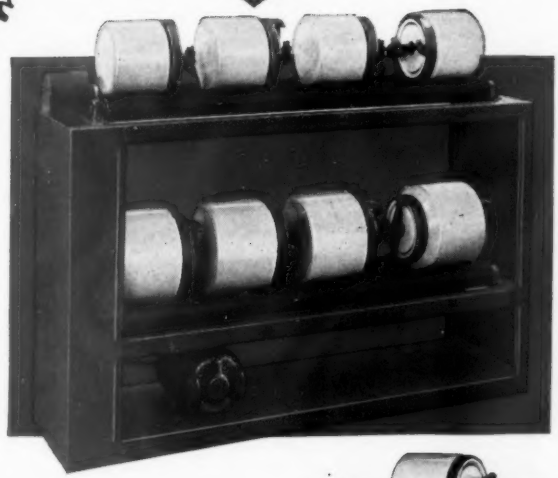
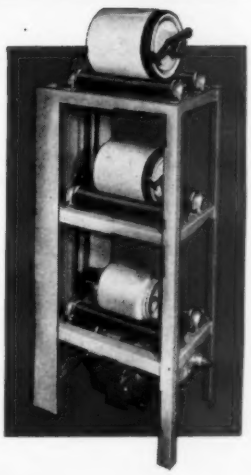
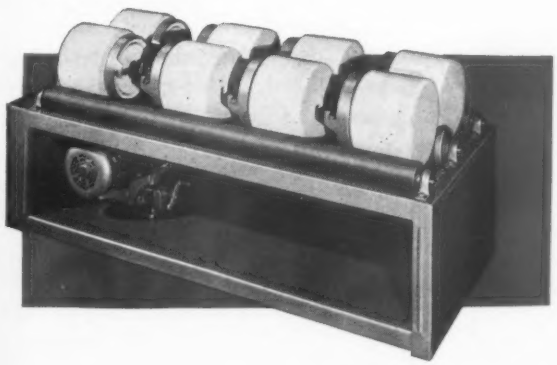




Above: Fig. 802D 2-Tier Long-Roll Jar Mill with 2 parallel rolls; handles jars 2" to 15" in diameter.

Right: Fig. 784 3-Tier "Unitized" Jar Mill has exclusive "self-centering" rollers; handles jars 2½" to 13" in diameter.

Left: Fig. 901DV 1-Tier Long-Roll Jar Mill has 3 parallel rolls; variable speed drive; rolls jars 2" to 15" in diameter.



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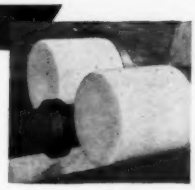
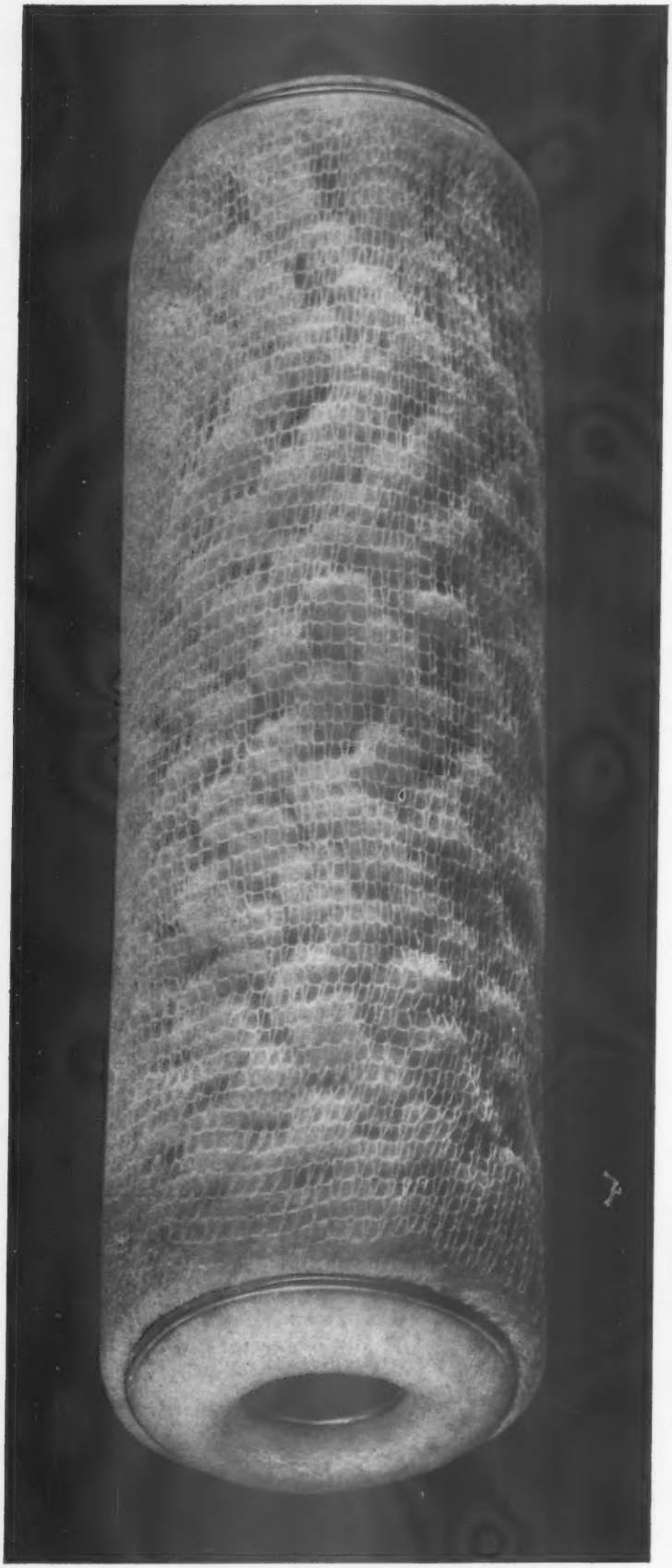
HANDY HINTS ON JAR MILLING



You can keep grinding jars separated and positioned exactly where you want them on any long-roll mill with patented "U.S." Jar Positioners. Made of long-wearing hard rubber, simple to install, can be quickly moved to any position.



this NEW cartridge has increased filter life as much as 600%

Tested and proved in plant after plant, on the toughest production runs, the new AFCO "Feutron" filter cartridge has given up to 600% longer life . . . 600% more capacity . . . and a cleaner, more uniform product, day after day.

The AFCO cartridge embodies a new filtration principle, featuring custom-engineered fibers of selected diameter and consistent cartridge density throughout the micron range. The unique construction of the filter media guarantees increased solids capacity, lower pressure drop (which permits a higher filtrate rate), and more uniform performance . . . all of which adds up to a more efficient, economical filter cartridge!

And when you buy the AFCO "Feutron" filter cartridge, you deal *direct* with an American Felt Company salesman. This direct service distribution policy keeps you in personal contact with our engineering and research laboratories . . . offers you the benefit of over 60 years of filtration experience.

Write for full details today.

American Felt Company

AMERICAN FELT COMPANY
212 Glenville Road
Glenville, Connecticut

OVER 60 YEARS OF FILTRATION EXPERIENCE

NEW EQUIPMENT AND MATERIALS

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.

CLARK EQUIPMENT

ELECTRIC TRUCK
Narrow Aisle Stacking

A reach-type, narrow aisle electric fork truck, 38 inches wide, has been introduced.

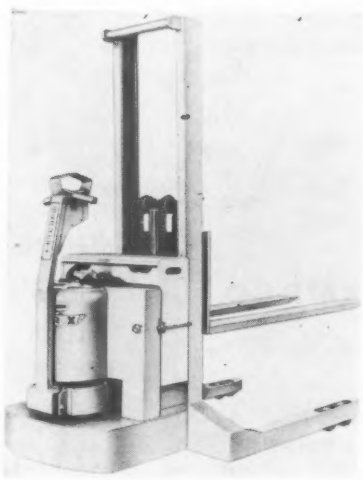
Named the "NR-40," the truck's features include power brakes which are hand-operated rather than foot-operated, power steering, dual operating controls, two wheel drive and automatic fork tilt. The truck's capacity is 4000 lbs. at 24 inch load center.

Designed to operate in confined areas, the "NR-40" can stack 48 inch long loads at right angles in a seven foot wide aisle. Top forward speed with full load is six mph. The truck has six speeds in each direction.

A forward tilting feature automatically tilts forks forward two degrees at the extreme bottom of the fork lowering motion. When forks are raised they automatically return to a horizontal position. An optional back-tilting feature automatically tilts forks back three inches when carrying a load.

Specifications of the "NR-40" are: length, from rear of load, 36 inches; overall width, 38 inches; height to top of overhead guard, 83 inches; wheelbase, 58 inches; weight, 5500 lbs., including standard battery having a rating of 13.3 kilowatt hours.

Industrial Truck Division, Clark Equipment Company, Dept. PVP, Battle Creek, Mich.



BARRETT-CRAVENS

LIFT TRUCK
Narrow Aisle Stacking

A redesigned electric straddle hi-lift truck with 4000 pounds standard capacity is now available.

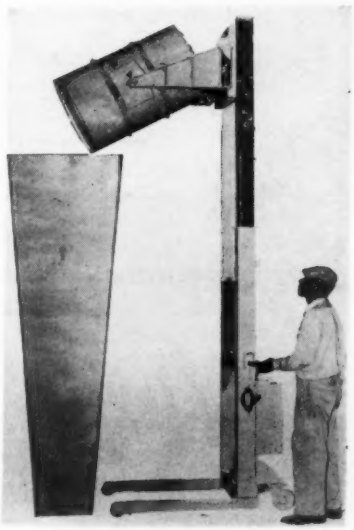
This Powerox Model STG-40 walkie type straddle truck is said to be ideal for handling pallet loads in narrow aisles, in plants where distances and speeds do not justify rider trucks.

Among the features of the STG-40 is the new gear drive designed as a single package unit. The lower transmission assembly and drive wheel are mounted to rotate on 2 heavy-duty thrust bearings, so that only the drive wheel and transmission pivot with the steering handle, while the drive motor remains stationary. The high current power leads securely fastened to the motor never become loose or worn by movement, eliminating future maintenance.

Controls are placed for convenience in the steering handle which is shaped to fit the contour of the operator's hand. A thumb touch speed control switch gives instant response through two speeds forward and two speeds reverse, with first speed adjustable to suit the application. Three speeds are available. Fork lifting and lowering pushbuttons are at rear of the handle.

A hydraulic lift system combines lift motor, pump, overload by-pass valve and reservoir in a single package unit. An oil filter and electrically operated lowering valve are included.

Barrett-Cravens Co., 628 Dundee Rd., Northbrook, Ill.



SPECIALTY MACHINERY

DRUM HANDLERS
Has Telescoping Mast

The addition of powered high-lift models to the firm's line of all purpose drum handlers has been announced.

These models employ a telescoping mast which permits a low,

close height for easy manuevering.

The drum handler is said to be designed to make it fast, easy, and safe for one man to handle, raise, lower, rotate, and dump loaded drums.

Model 796, which will pick up a drum from either a horizontal or vertical position, will elevate up to 800 pounds to a height of 8 feet above the floor with the drum vertical or 8′ 7″ with the drum horizontal.

In the pouring position the drum head extends a full 10 inches past the wheels, regardless of height.

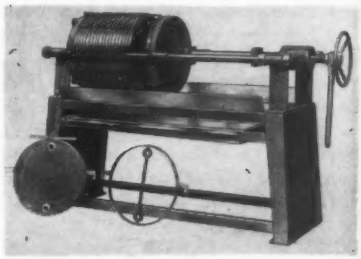
The Model 796 drum handler is available in a choice of three drives: battery powered with built in charger; air motor; and explosion proof A. C. electric—all of which provide speeds of 16 FPM.

A variety of accessories is available to extend the utility of the unit. These include fibre drum jaws, bag adaptors, power tipping attachments, and spark-proof wheels.

Specialty Machinery Corp., Dept. PVP, 50 Roanoke Ave., Newark 5, N. J.

FILTER PRESS
In Standard Sizes

Filter presses are completely fabricated in all the stainless steels and in carbon steel, in standard sizes from 12 to 42 inches in diameter. All surfaces on both standard and high pressure models are precision machined to give smooth, gasket-like sealing surfaces, the manufacturer says.



STAR

Other features cited by the manufacturer include: lighter weight plates and frames, ease of cleaning, pressures to fit specified requirements, and a cost reportedly less than cast machines. Star Tank and Filter Corp., Dept. PVP, 875 Edgewater Rd., New York 59, N. Y.

WATER SOLUBLE OIL
For Metal Baking Primers

New Kelsol 1209 is water thinned and thinnable, with no emulsifiers or additives required, the company reports. Excellent spraying at varying viscosities is claimed as well as full flow without sag in dip applications.

It is said to be resistant to salt corrosion, water and humidity. Company says the new formulation reduces fire hazard. Spencer Kellogg and Sons, Inc., Dept. PVP, Buffalo 5, N. Y.

CONVEYOR
Stationary or Portable Models

A time and labor saving device for lifting and dumping drums or bags has been announced. The unit is designed for low-cost batch loading of mixers, blenders, kettles, tanks and other process equipment.

Termed the Cesco Jr. Model DU, the conveyor lifts and dumps a variety of standard size drums. It can also be adapted to lift and discharge bags. The unit has broad application in industry wherever bulk materials are received in these types of containers.

Available in capacities to 400 pounds and dumping heights to 12

COVER THE EARTH

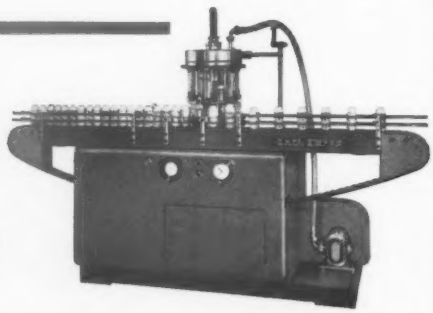
THE SHERWIN-WILLIAMS CO.

Covers the Earth in rapid time, with paints filled can after can by Kiefer.

The Kiefer Cadet Model Vari-Visco Filler does its job neatly and accurately without a drop of drip.

For AEROSOL charging, you can name the speed KIEFER has the right size machine for your needs.

THERE ARE KIEFER FILLING MACHINES TO SATISFY YOUR EVERY REQUIREMENT



Kiefer

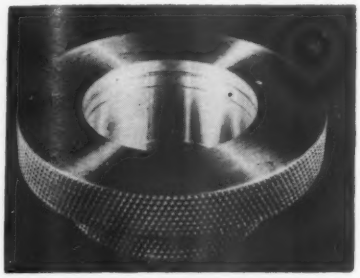
CADET MODEL VARI-VISCO FILLING MACHINE

With automatic feed and discharge conveyor—handles paints, varnishes and oils to perfection. "Bottom-up" fill gives viscous materials a solid volumetric pack. . .also a liquid fill, without splash. . .TINS, POLYETHYLENES, AEROSOLS.

The Karl Kiefer Machine Co.

933 MARTIN STREET CINCINNATI 2, OHIO
NEW YORK • BOSTON • CHICAGO • SAN FRANCISCO • PHILADELPHIA
HOUSTON • VANCOUVER • SAVANNAH • LOS ANGELES • LONDON, ENGLAND

feet. Models are stationary or portable. Variations can be designed for other heights and capacities. Conveyors and Dumpers, Inc., Dept. PVP, Caldwell, N. J.



GARDNER

CUP
Water-Vapor-Transmission

New type water-vapor-transmission cup has been developed.

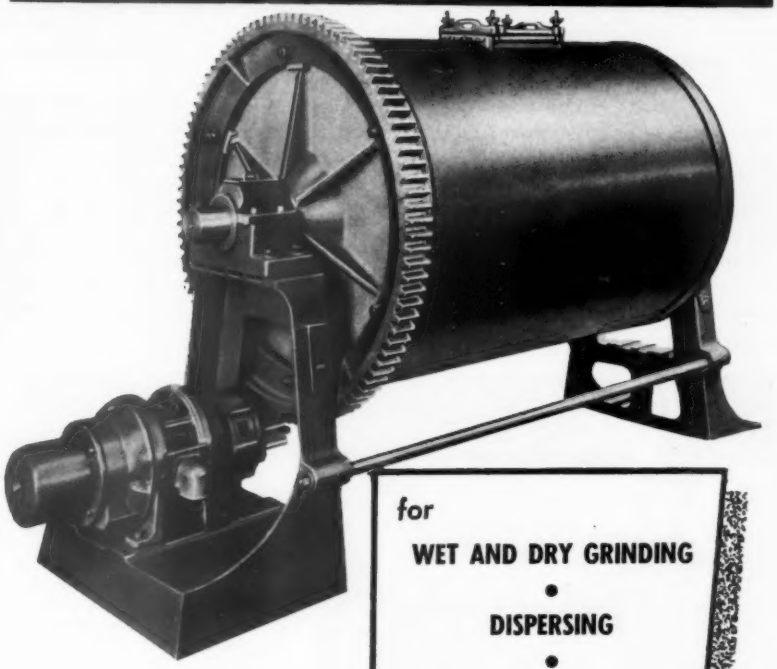
This cup is reported to be very reliable and simple to use.

A gastight seal of the film specimen is obtained with the new cup. Two polyethylene gaskets keep the film in a gastight seal when the holding ring is tightened down, using only hand pressure on the screw top. The holding pins prevent the development of torsion tearing forces in the film sample during tightening of the screw top. Film samples, it is said, can be mounted rapidly and securely.

The water-vapor permeability is obtained by placing a desiccant, such as silica gel, calcium chloride or phosphorous pentoxide, in the cup before the specimen film is clamped in place. Measurements are then made in the same manner as with all other water-vapor-transmission cups. The cup is placed in a constant-humidity chamber, then removed and weighed at intervals until the gain in weight per unit time becomes constant. When this equilibrium state is reached, the water-vapor-transmission may be calculated in grams of water transmitted through the film per 24 hours per square meter, or in any other convenient units to describe the specific permeability of a film to moisture.

Gardner Laboratory, Inc., Dept. PVP, P. O. Box 5728, Bethesda 14, Md.

ABBÉ Engineering Ball and Pebble Mills



for
WET AND DRY GRINDING
•
DISPERSING
•
MIXING
•
PROCESSING

ABBÉ Engineering Ball and Pebble Mills are available in capacities from 30 lbs. (dry), 5 gal. (wet), to 14,000 lbs. (dry), 2500 gal. (wet).

It will pay you to investigate these, as well as Abbé Jar Mills and Jar Rolling Machines, which cover every need and capacity.

Write for Catalogs 73 and 77 and complete data.

abbé ENGINEERING COMPANY
620 K Graybar Bldg., New York 17, N. Y.
Designers and Manufacturers of
Ball, Pebble and Jar Mills • Pulverizers • Sifters • Cutters • Mixers

NEW MATERIALS — EQUIPMENT

CAN DEPALLETIZER
To Handle Round Cans

Two new empty can depalletizing machines which operate at normal line speeds and handle all types of round cans have been designed.

The Manual machine will depalletize cans at speeds up to 700 cans per minute for the 300 x 407 size, fully utilizing the operator who manually sweeps the layers of cans into the waterfall blender. It is tailored to keep capital investment at a minimum, while providing simple design, rugged, compact construction and safe operation.

The Standard machine is more highly mechanized than the Manual, with can handling speeds increased up to 900 cans per minute for the 300 x 407 size and a reduction in operator utilization. Among its advantages are a powered sweep arm and a can transfer (temporary storage) belt.

The sweep arm assembly is located at and is limited in height to the tin line, affording added visibility and increased safety to personnel over other machines.

Emergency stop action can shut off the sweep arm regardless of its position. The sweep arm stops gently at each end of its travel and automatically retracts when the control is returned to neutral. The pallet hoist is interlocked with the sweep arm so that the hoist will not raise unless the sweep arm in retracted, precluding serious machine damage.

Contintenal Can Co., 100 E. 42nd St., New York 17, N. Y.

ZINC OXIDES
Improved Dispersion Properties

A new series of zinc oxides for the paint industry which feature improved wetting and dispersion characteristics has been announced.

Dispersion of the new oxides in typical house paint vehicles demonstrate that Hegman Gage readings of 4 can be obtained in a cowles dissolver in less than one minute, the company reports. According to the manufacturer, no other zinc oxide tested achieved the same degree of dispersion in less than 15 minutes.

St. Joseph Lead Co., Dept. PVP, 250 Park Ave., New York 17, N. Y.

VACUUM SYSTEM
Quick Pump-down

New Vacuum system unit produce any desired moderate vacuum (250 mm down to 0.5 mm) and automatically hold it within ±0.2 mm, in an air-tight system. You get a superior vacuum to that of most house lines, and none of the erractic fluctuations that disturb such sources.

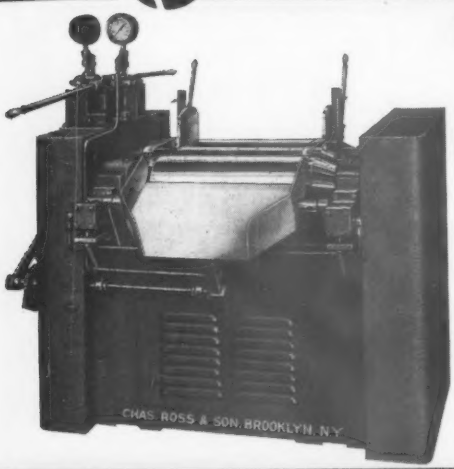
The unit uses a ½-hp, two-stage Welch Duo-Seal vacuum pump, running at 525 rpm, with a free air capacity of 58 liters/minute. Large valve openings and connections speed pump-down. Fisher Scientific Co., Dept. PVP, 384 Fisher Building, Pittsburgh 19, Pa.

DRIVE AGITATORS
Maximum Rigidity

A complete line of heavy duty vertical drive agitators is now available which incorporates among other features, an output shaft bearing assembly designed to provide maximum rigidity and minimum shaft deflection, which assures constant shaft alignment under all loading conditions.

This exclusive development by U. S. Mixer Division of Stockdale Engineering Company, has been

NEW ROSS ONE POINT HYDRAULIC HIGH SPEED THREE ROLL MILLS WITH — ROLL ADJUSTMENT

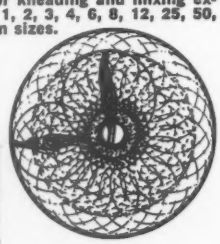


- Pressure indicating gauges provide greater ease in properly setting rolls, and less skill or experience is required by operator.
- Roll pressure settings can be recorded for exact reproduction of material assuring standardization of product.
- Special equalizers assure positive parallelism of roll faces at all times for uniform dispersions and minimum maintenance costs.
- Mills have quick roll release with safety overload feature, and are convertible for either fixed or floating center roll operation. 2½x5, 4½x10, 6x14, 9x24, 12x30, 14x32, and 16x40" sizes.

PRODUCTION SIZE DISPERSION TYPE CHANGE CAN MIXERS WITH DOUBLE PLANETARY STIRRER ACTION

- Stirrers with special blade angles and very close clearances revolve on their own axis and also around can developing 12 intense compressive and shearing actions with each revolution to break down and disperse agglomerates.
- Variable speed for infinite range of stirrer speed control.
- Simplified vertical hydraulic lift for greatest ease in cleaning down stirrers.
- Non-revolving can is completely enclosed during mixing for safety and to reduce solvent loss. Cans can be jacketed or fitted with slide gate when required. Cans are easily positioned or removed from Mixer.
- Extra heavy construction and standard type motor eliminate costly downtime. Oversized motor drives can be provided for kneading and mixing extremely heavy materials. 1, 2, 3, 4, 6, 8, 12, 25, 50, 65, 85, 125 and 150 gallon sizes.

Area of can contacted by stirrers during only one revolution of stirrers around can (2 seconds). Position of stirrers advances 4½° with each successive revolution to sweep entire area and all points on sides of can. Stirrers overlap each other as well as center of can.



Write for further information!

CHARLES ROSS & SON CO., INC.
ESTABLISHED 1869
148 CLASSON AVE., BROOKLYN 5, N. Y.

engineered to overcome many of the inadequacies commonly found in conventional mixing equipment. Run-out or deflection at the center of the seal or stuffing box is controlled within close limits so as to virtually eliminate wear at this critical point. As a result, these units are as well suited for the more difficult applications requiring operation under pressure or where noxious or corrosive fumes may be contained, as for ordinary open tank agitation. Minimum shaft deflection and attendant long-life sealing also assures peak performance for long deflection and attendant long-life sealing also assures peak performance for long periods of time with practically no downtime for stuffing box maintenance or seal replacement. Packaged seal cartridges are available to operate at pressures up to 2500 psi, and specially cooled seal cartridges are also available. The cartridge type mechanical seal can be changed without disturbing the drive or the impeller shaft. U. S. Mixer, Division of Stockdale Engineering Co., Dept. PVP, Haddonfield, N. J.

OVEN

Temperature Control

New design in the Saf-T-Bilt oven line includes; improved shape and sizes for industrial laboratory use, more efficient direction of air flow in the work chamber, accurate temperature control throughout work chamber and new safety controls to enlarge its usefulness in laboratories, it is claimed by the manufacturer. The oven is electric heated. It can, also, be adapted to use steam or hot water at available pressures. Two swinging doors provide an oven aperture 37″ x 37″ for easy fast-loading. A heavy duty observation glass window is inserted in one door. Safety features include: a special explosion relief panel in back, safety latches and safety chain on swinging doors; also contactors, relays, motor starters, main controllers and Hi-Limit instruments are enclosed in explosion proof housings, explosion proof motors and strip heaters with welded connections to reduce spark hazards. A forced exhaust system discharges volatiles from work chamber. The oven requires little preheat time to reach temperature. The special convection heat design permits fast heat penetration of all products in the chamber. Available in sizes to fit any laboratory. Despatch Oven Co., Dept. PVP, 611 S. E. 8th St., Minneapolis, Minn.

RESINS

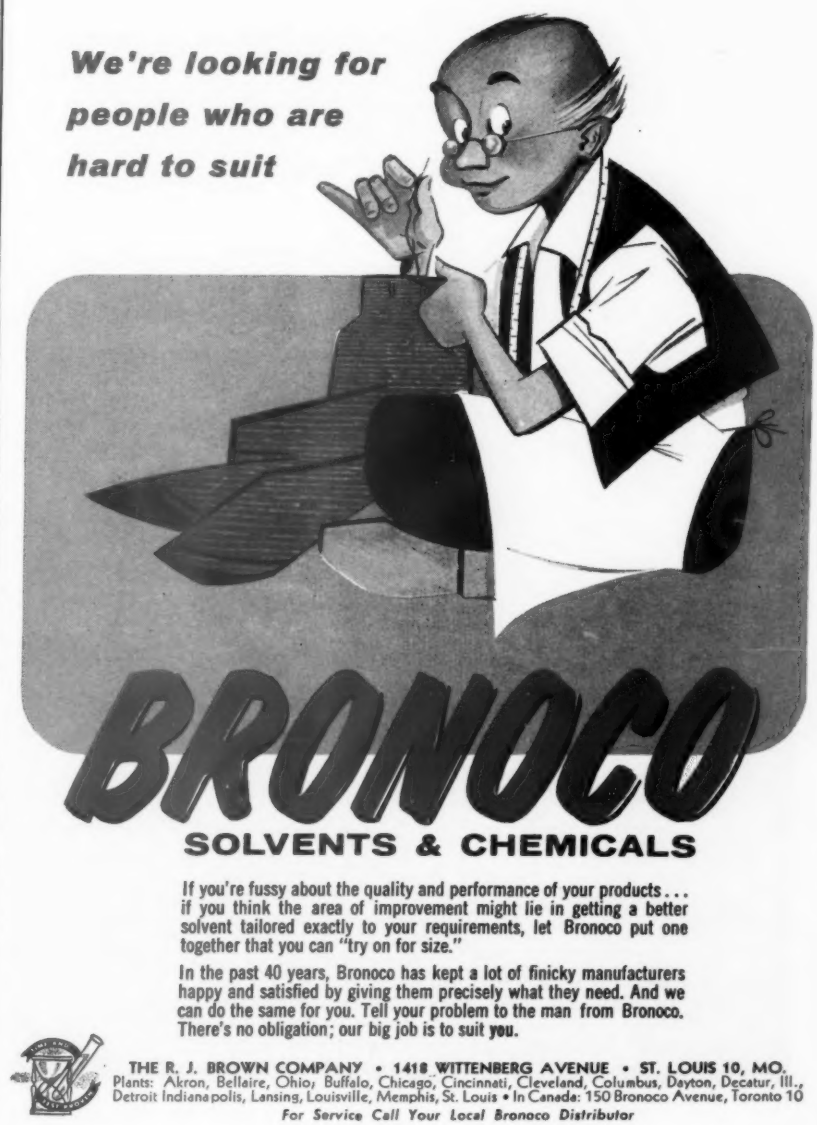
Available to American Firms

Dutch know-how and attention to quality has resulted in the development of resin products for the paint technologist throughout the world which are now available to American paint manufacturers.

Among new offerings by this firm is Setal 20, a medium oil-length alkyd resin based on linseed oil. Thanks to the ingenuity of the Synthese chemists, this resin effects rapid drying and hardening. The paint technologist who wants to improve his air-drying enamels will find Setal 20's properties in air-drying indoor and outside enamels more than satisfactory.

Setal 20 is especially suited for numerous special purposes. It is said to have:

(a) Outstanding water resistance, especially good for rust-preventing paints.
(b) Good flow, for dipping enamels.
(c) Good compatability with


We're looking for
people who are
hard to suit
BRONOCO
SOLVENTS & CHEMICALS
If you're fussy about the quality and performance of your products . . . if you think the area of improvement might lie in getting a better solvent tailored exactly to your requirements, let Bronoco put one together that you can "try on for size."
In the past 40 years, Bronoco has kept a lot of finicky manufacturers happy and satisfied by giving them precisely what they need. And we can do the same for you. Tell your problem to the man from Bronoco. There's no obligation; our big job is to suit you.
THE R. J. BROWN COMPANY • 1418 WITTENBERG AVENUE • ST. LOUIS 10, MO.
Plants: Akron, Bellaire, Ohio; Buffalo, Chicago, Cincinnati, Cleveland, Columbus, Dayton, Decatur, Ill., Detroit Indianapolis, Lansing, Louisville, Memphis, St. Louis • In Canada: 150 Bronoco Avenue, Toronto 10
For Service Call Your Local Bronoco Distributor

melamine resins, for stoving enamels.

(d) High gloss and outstanding weather resistance, for air-drying and forced-drying repair enamels for motorcars, trucks, etc.

(e) Good pigment absorption capacity and excellent compatability with basic pigments, as a grinding medium.

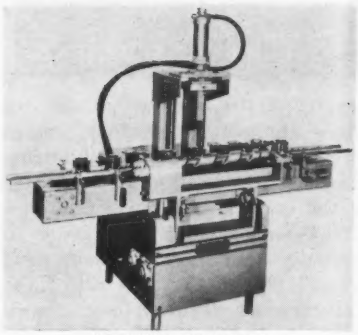
Netherlands Trade Commission, Dept. PVP, 551 5th Ave., New York 17, N. Y.

LINE MACHINE
Codes Container Bottoms

A new Type 22 production line bottom coder that makes a non-transferable embossed code on the bottom of a metal container has been announced.

The coding process is claimed to be ideally adapted to the coding of paint cans or any other similar type of open-mouth metal container.

The machine enables a manufacturer to code the bottom of a container instead of a lid. The container is coded in the line just ahead of the filling operation. All costs and problems of pre-coding lids and attempting to make the coded lids match the number of containers filled are completely avoided by this coding process.



ARTHUR COLTON

The machine will code-emboss all sizes of open-mouth cans ranging from ½-pint to one-gallon capacity. Coding speeds are from 15 to 35 containers per minute. The code is embossed automatically on the bottom of a container each time the timing screw on the machine feeds a can into coding position and holds it while the embossing operation is performed. Embossing of the code in a container is accomplished by a fixed female die in the base of the machine and a moving upper male die that is fed downward by an air cylinder.

Arthur Colton Co., Dept. PVP, 3400 E. Lafayette, Detroit 7, Mich.

FATTY ACID
Color Stability

A new tall oil fatty acid having much lighter and improved color stability characteristics was announced.

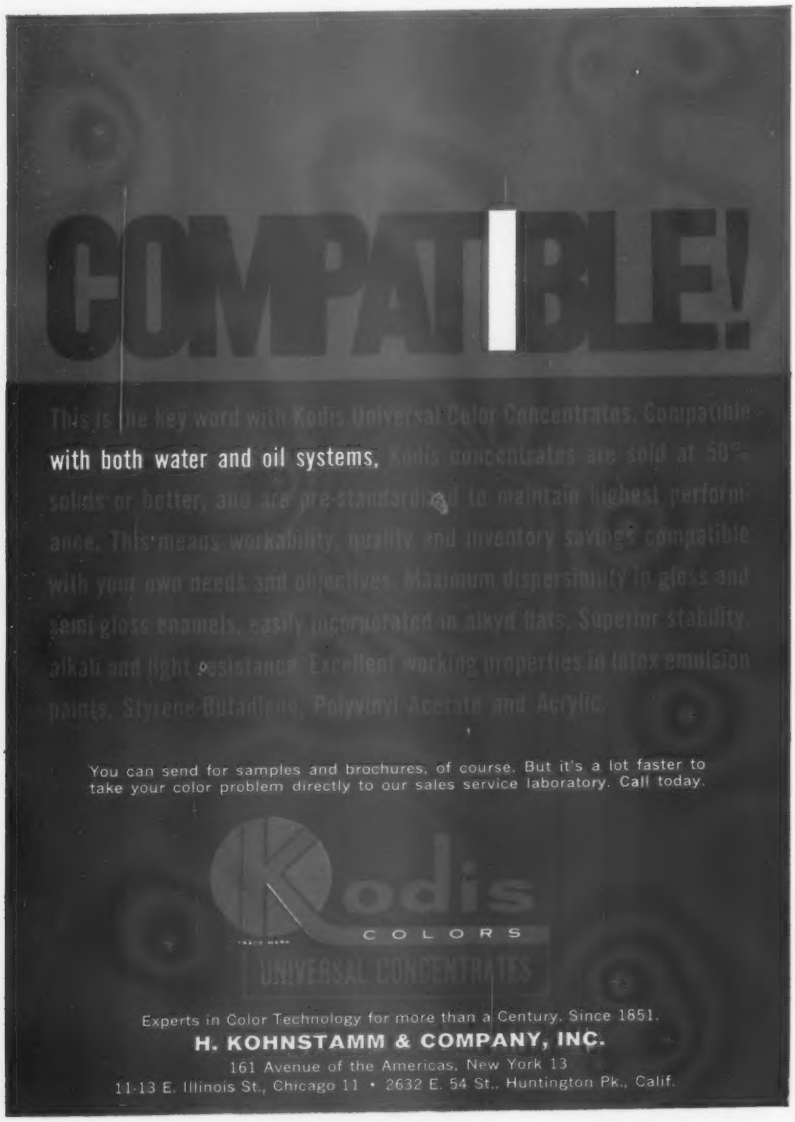
Arizona is a jointly-owned subsidiary of American Cyanamid Company and International Paper Company.

The product, Acintol FA 1 Special, is expected to find initial application in surface coating vehicles, liquid soap products, synthetic detergents and plasticizers.

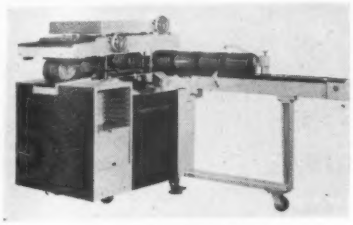
Architectural and industrial enamels formulated with this product show excellent initial color and resistance to yellowing in addition to maintaining the high gloss characteristics that can be obtained in long to short oil length alkyd vehicles.

Liquid soap products, in addition to having improved color characteristics, can be made to higher soap solids content through use of this product.

The exceptional color stability


COMPATIBLE!
with both water and oil systems,
You can send for samples and brochures, of course. But it's a lot faster to take your color problem directly to our sales service laboratory. Call today.
Kodis
COLORS
UNIVERSAL CONCENTRATES
Experts in Color Technology for more than a Century. Since 1851.
H. KOHNSTAMM & COMPANY, INC.
161 Avenue of the Americas, New York 13
11-13 E. Illinois St., Chicago 11 • 2632 E. 54 St., Huntington Pk., Calif.

of Acintol FA 1 Special will enable manufacturers to control the formulation and production of finished products more closely. Arizona Chemical Co., Dept. PVP, 30 Rockefeller Plaza, New York 20, N. Y.



CHARLES BECK

CAN IMPRINTER

¼ Pint to Gallon Cans

New can imprinter has been announced.

The clarity and quality of the imprint said to match the quality and style of the lithography on regular or aerosol cans.

This machine will handle cans or containers made of metal, plastic or fibre either filled or empty. Only two settings are required to change can size from ¼ pint to a gallon (with or without ears). The 8″ x 11″ plate or individual type can be changed in a matter of minutes.

Machine is completely self-powered for production use, it is compact (4 x 8 foot floor space) and built on castors for easy mobility.

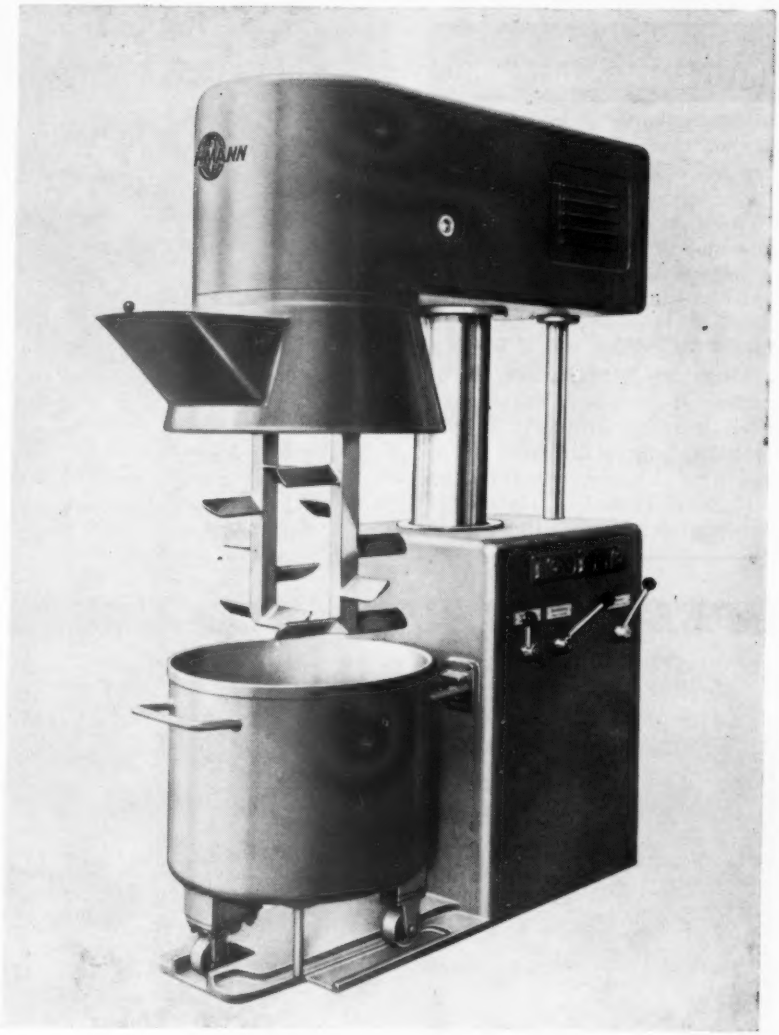
Charles Beck Machine Corporation., Dept. PVP-1, King of Prussia, Pa

ACRYLIC RESINS

For Metal Coatings & Finishes

The production of two new thermosetting acrylic polymeric resins for coatings have been announced. Because the acrylics have always been considered thermoplastic, this is a big step forward in coatings technology. The two new products, which are baking enamel components, are a solution polymer designated Acryloid AT-50, and an emulsion polymer designated Rhoplex AC-200.

Both of these compounds are suggested for formulation into metal coatings and finishes. Acryloid AT-50 is made available in organic solvents. It cures at standard enamel baking temperatures to an



THE LEHMANN PLANETARY MIXER
improves output and reduces cost

No engineering detail has been overlooked to make this modern Mixing and Kneading Machine the most efficient and economical in its field. For the intensive and uniform mixing of highly fluid, viscous and pasty materials it is unsurpassed.

The planetary action is uniquely effective. Two mixing spindles equipped with helically arranged vanes move along the tank wall while rotating at high speed around their own axes. The mixing mechanism is raised and lowered automatically.

Swivel, tilting, run-out or stationary tanks are provided in capacities from 1 to 350 gallons. The use of several tanks permits almost continuous production. The machine is available in several types and power specifications. Stainless steel or other metals are obtainable if required. The unit can be cleaned quickly when frequent changes are desired in shade or type of product processed. Maintenance costs are unusually low.

Write or telephone for prices and further information.

LEHMANN
world renowned in processing machinery

J. M. LEHMANN COMPANY, Inc.

550 NEW YORK AVENUE, LYNDHURST, N. J.

extremely hard, glossy film with excellent resistance to soaps, detergents, stains, and solvents.

The acrylic emulsion polymer, Rhoplex AC-200, is supplied in an aqueous medium. Upon baking, it is converted to a hard, glossy, water-resistant film with excellent chemical, humidity, adhesion and impact resistance.

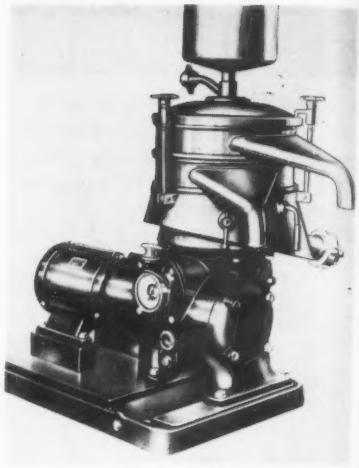
These new preparations are intended for finishes on automobiles, steel drums, machinery, hospital equipment, metal furniture, stoves, and in other quality metal finishes.

Rohm & Haas Co., Dept. PVP, Washington Square, Phila. 5, Pa.

SEPARATORS
Pilot-Scale Versions

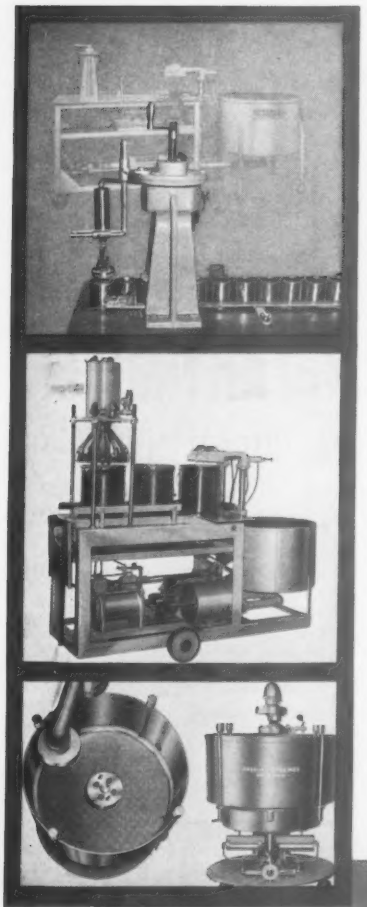
Because of the rapidly increasing popularity of new types of continuous centrifugal separators and clarifiers in chemical and food processing such as the Westfalia Automatic De-Sludgers and Nozzle Separators (Concentrators), two new pilot-scale versions of these centrifuges have been introduced.

Similar in construction and operation to the "parent" machines, the Skog "Jet-O-Matic" Nozzle Separator and the Saooh De-Sludger, the pilot-scale models can be used for both laboratory research and pilot plant production, to accurately determine the characteristics of any process involving continuous removal of solids in two ranges: the Skog for liquids with solids content of up to 20 per cent; and the Saooh for liquid mixtures with up to 5 per cent solids content. Centrico, Inc., Dept. PVP, Englewood, N. J.



CENTRICO

SPEED OUTPUT... CUT COSTS
with these Time-Tested Portable
FILLING and SEALING MACHINES



MODEL PF-9C
FILLS, SEALS, COUNTS, CODES

With this air-operated, portable machine, ONE OPERATOR seals, fills, counts and codes HALF-PINTS 30 to 35 a minute. PINTS or QUARTS 25 to 30 per minute. ½-GALLONS, 18 to 20; GALLONS, 16 to 18. No materials wasted. Accurate No-Drip Nozzle delivers a clean package. Used by major Paint manufacturers. (U.S.A. and Foreign).

MODEL DPF 5-1
COMBINATION FILLER and SEALER of LUG or RING-TYPE PAILS

This duplex air-operated unit fills and seals PER MINUTE 6 to 8 *FIVE*-GALLON PAILS—8 to 12 *TWO*-GALLON PAILS—14 to 16 *ONE*-GALLON (depending on viscosity of product). It stops the waste of old-fashioned handling of heavy containers with SAFE, CLEAN, ACCURATE production methods. Needs only one man and 60 lbs. plant air. Endorsed by leading Paint Manufacturers.

MODEL PSM-2
SELF-CLEANING, HIGH-PRODUCTION STRAINER

Constructed of non-corrosive metals throughout, this portable Self-Cleaning Strainer has INTERCHANGEABLE SCREENS 10 to 250 mesh. Built for lasting heavy-duty production, it cleans high viscosity fluids 30 GALLONS A MINUTE. Gearless, safety air-powered. An evolution in paint-straining equipment for all Paint, Varnish and Lacquer Manufacturers or Processors of industrial, chemical, or food oils and fluids.

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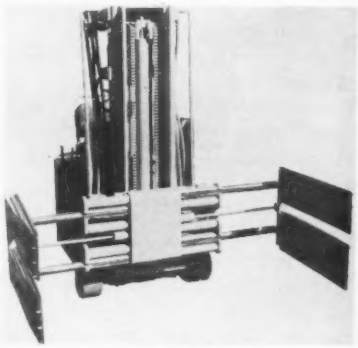

LEWIS-SHEPARD

LOAD GRAB
Multi-Purpose Arms

SpaceMaster Model "J" with cascade clamp and multi-purpose arms makes it possible to handle almost any type of non-palletized load. Multi-purpose arms eliminate the necessity of using a different truck or changing arms when handling different types of loads. These all-purpose arms will handle unit loads of drums, cartons, crates, bales, rolls and many others.

The arm gripping surface is either smooth or rough-top rubber bonded to steel sheets which are screwed to the plates. Other types of surfacing are also available.

Lewis-Shepard Products, Inc., Dept. R9-10-PVP, 125 Walnut St., Watertown 72, Mass.

PATENTS

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired (to foreign countries $1.00 per copy) to the publisher.

Silicone-Silicious Pigment-Dispersion

U. S. Patent 2,891,875. Ellis Hall Phreaner, Los Angeles, Calif., assignor of one-third to H. Calvin White, Pasadena, Calif.

The process of making siloxane-coated silicic pigment and filler particles that includes reacting a water soluble silicate in aqueous solution with a metallic compound dissolved in the solution to convert said soluble silicate to a water-dispersed insoluble silicic precipitate, and coating the precipitate as it is formed with a poly-siloxane oil by dispersing the oil in fine particle form within the solution while maintaining it in a state of active agitation during formation of the precipitate.

Polyamide-Polyester Resin

U. S. Patent 2,889,292. Dwight E. Peerman, Minneapolis, Minn.. assignor to General Mills, Inc., a corporation of Delaware.

A polyamide-polyester composition, the active reactants of which consist essentially of (*a*) an alkyd resin of a polycarboxylic acid selected from the group consisting of maleic, fumaric, citraconic, mesaconic, itaconic, and aconitic acids and (*b*) a polyamide derived from polymeric fat acids and an alkylene polyamine at reaction temperatures of approximately 200°C. for approximately three hours, the polyamide having a melt viscosity in the approximate range of 100 to 2000 poises at 40°C. and having an amine number of at least 50, said amine number being an expression of the number of milligrams of potassiums hydroxide equivalent to the free amine groups in one gram of the polyamide.

Oil-Modified Alkyd

U. S. Patent 2,889,293. William L. Hensley, Albert J. Kirsch, and Ralph E. Layman, Jr., Stamford, Conn., assignors to American Cyanamid Co., New York, N. Y., a corporation of Maine.

A composition of matter comprising a mixture of (1) an alkyd resin modified with a member selected from the group consisting of glyceride oils, glyceride oil fatty acids and their monoglycerides and (2) the resinous reaction product of (*a*) an aliphatic polycarboxylic acid,

piccolyte

PICCOLYTE is outstanding in critical compounding. The excellent chemical properties of PICCOLYTE Resin along with its color stability provide many compounding opportunities.

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PENNSYLVANIA INDUSTRIAL CHEMICAL CORPORATION

CLAIRTON, PENNSYLVANIA

(*b*) an oil fatty acid and (*c*) the adduct of an alkylene oxide having from 2-4 carbon atoms with a polyhydric alcohol having from 2-4 carbon atoms with a polyhydric alcohol having at least 5 carbon atoms and at least 4 hydroxy groups wherein said adduct contains from about 3 mils to about 7 mols of said alkylene oxide per hydroxy group ofsaid polyhydric alcohol.

Vinyl-Alkyd Resin

U. S. Patent 2,890,185. James H. Sample, Chicago, and Charles H. Williams, Homewood, Ill., assignors to The Sherwin-Williams Co., Cleveland, Ohio, a corporation of Ohio.

A composition of matter comprising the reaction product produced by heating at a temperature in the range of from about 240°F. to about 460°F. in the presence of a catalyst, (I) an oil modified alkyd prepared by reacting a polycarboxylic acid, an aliphatic monacarboxylic material selected from the group consisting of the acids of drying oils, the acids of semi-drying oils and mixtures of such acids and drying oils, semi-drying oils and mixtures thereof, and a saturated aliphatic polyhydric alcohol, said alkyd having an oil length of from 33% to 85%. an acid value of less than about 40, and an excess of hydroxyl ranging up to about 50% over that theoretically required to react with the carboxyl content; and, (II) a monomer composition prepared by admixing: (*a*) from about 10% to about 85% by weight of said monomer composition of a polymerizable monomeric monovinyl aromatic compound; (*b*) from about 5% to about 85% by weight of said monomer composition of a polymerizable monomeric ester of an unsaturated aliphatic acid having the formula:

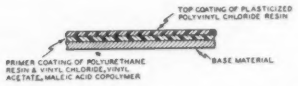
$$CH_2{=}C(R){-}CO_2R'$$

wherein R is selected from the group consisting of hydrogen and alkyl radicles of from 1 to 4 carbon atoms and R′ is an alkyl radicle of from 1 to 8 carbon atoms, and (*c*) from about 10% to about 50% by weight of said monomer composition of a monomeric nitrile

Primers for Vinyl Chloride Coatings

U. S. Patent 2,891,876. Kenneth L. Brown, Library, and William H. McKnight, Pittsburgh, Pa., assignors to Union Carbide Corp., a corporation of New York.

A process for coating an article with a plasticized polyvinyl chloride resin,


TOP COATING OF PLASTICIZED POLYVINYL CHLORIDE RESIN
PRIMER COATING OF POLYURETHANE RESIN & VINYL CHLORIDE, VINYL ACETATE, MALEIC ACID COPOLYMER
BASE MATERIAL

said process comprising applying to said article an adhering prime coating, said prime coating consisting essentially of a liquid polyurethane resin and a copolymer of vinyl chloride, vinyl ester and one of the materials in the group consisting of maleic acid and maleic anhydride, said polyurethane resin being the product of the reaction between a diisocyanate and polyalkylene glycol, said diisocyanate and said polyalkylene glycol being reacted in such proportions that the NCO/OH ratio is between 1.2 and 3, and applying a plasticized polyvinyl chloride resin to said prime coating.

Polymer Coating Compositions

U. S. Patent 2,901,454. Francis S. Stewart, Los Angeles, Calif.

1. A coating composition comprising further polymerizable polymers of alkyl methacrylate, the alkyl portion of which has from one to four carbon atoms admixed with polymerization catalyst and dissolved in a volatile solvent vehicle comprising a volatile solvent polymerization permitter means which in the absence of polymerization inhibitor permits further polymerization of said further polymerizable polymers, said mixture of polymers, catalyst and solvent being such that further polymerization at said polymers will take place under conditions of coating application in the absence of polymerization inhibitor, and a sufficient proportion of volatile solvent polymerization inhibitor means to inhibit further polymerization of said further polymerizable polymers under conditions of coating application even in the presence of said polymerization permitter, said polymers admixed

LATEX PAINTS SHOW EXCEPTIONAL ADHESION AND WASHABILITY

When they are made with: COFAR

An Acrylic Polyvinyl Acetate Copolymer Latex

COFAR based paints:

- Have High Water Resistance
- Maintain Good Film Integrity
- Assure Color Stability
- Have Excellent Color Uniformity

Low particle size assures quality paints at high pigment concentrations thus reducing costs. Formulation is easy with standard equipment. Used for primer-sealers, interior and exterior paints — especially recommended for brick, stucco, cinder block, and masonry.

Solids	55 ± 1%
pH	4 — 5
Average Particle size	.2 Micron
Freeze—thaw resistance	Excellent
Mechanical Resistance	Excellent
Borax Stability	Excellent
Water Resistance	Better than average PVA
Weight per gallon	8.9 — 9.1 lbs.

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with polymerization catalyst being capable of further polymerization without said polymerization inhibitor in an applied coating and being of sufficiently high molecular weight that there is substantially no evaporation thereof on application and drying of the coating composition but not of sufficiently high molecular weight to cobweb on spraying when present to the extent of 20% by weight of the composition, said polymerization catalyst being present in sufficient proportion to cause said polymers to further polymerize in the presence of said volatile solvent polymerization permitter when said coating composition is applied, upon removal of said volatile solvent polymerization inhibitor, and said volatile solvent polymerization inhibitor evaporating from the applied coating at a greater rate than said volatile solvent polymerization permitter so that upon application of the coating composition the concentration of polymerization inhibitor in the applied coating will be reduced by evaporation of said inhibitor at a greater rate than the evaporation of said permitter from the applied film leaving a film of such relatively reduced concentration of polymerization inhibitor that said further polymerizable polymers admixed with polymerization catalyst will further polymerize and produce a hard and tough polyalkyl methacrylate resin film from which said volatile solvent polymerization permitter evaporates leaving a dry, hard and tough polyalkyl methacrylate resin film coating, said volatile solvent polymerization permitter being a mixture of di-isobutyl ketone and 2-ethylhexanol and said volatile solvent polymerization inhibitor being a light petroleum aliphatic hydrocarbon solvent.

Wax Fortified Paint and Varnish

U. S. Patent 2,893,964. Edward A. Wilder, Racine, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.

A permanent protective coating composition comprising organic paint and varnish resins dissolved in an organic solvent therefor, characterized by improved water repellency and mar and abrasion resistance and having dissolved therein 0.5 to about 10% by weight, based on the coating content, of a synthetic wax compatible with said resins, said synthetic wax being an ester of an acyclic alkanol of 16-30 carbon atoms and β-carboxy adipic acid.

Polyurethane Coating Compositions

U. S. Patent 2,901,467. Carlton W. Croco, Newark, Del., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del., a corporation of Delaware.

1. A stable, curable polyurethane coating composition obtained by heating to a temperature of about 50 to 120° C. in an inert solvent (*a*) 1.0 molar proportion of a polytetramethylene ether glycol having a molecular weight of from about 400 to 2,000, (*b*) 0 to 1.0 molar proportion of an aliphatic diol having 2 to 8 carbon atoms, (*c*) 1.0 to 4.0 molar proportions of an aliphatic triol having from 3 to 6 carbon atoms, and (*d*) 4.0 to 11.0 molar proportions of an organic diisocyanate, until substantially all of the hydroxyl groups have been reacted with isocyanate groups; with the proviso that at least 25% by weight of the composition be the radicals obtained by removing the terminal hydrogens from the polytetramethylene ether glycol and that the molar proportion of organic diisocyanate which is used is such that the number of isocyanate groups is at least 3 greater than but less than twice the sum of all of the hydroxyl groups introduced into the reaction.

Coating Compositions

U. S. Patent 2,901,469. John C. Cowan and Howard M. Teeter, Peoria, Ill., assignors to the U. S. A. as represented by the Secretary of Agriculture.

A protective coating composition comprising a vehicle, a dryer and a film forming ingredient, said film-forming ingredient consisting essentially of homopolymers of vinyl ethers of polyunsaturated fatty alcohols, said film-forming ingredient being selected from the group consisting of homopolymers of the vinyl ether of linolenyl alcohol, the vinyl ether of linolenyl alcohol, and homopolymers of the vinyl ethers of the mixed polyunsaturated fatty alcohols obtained

Weather Testing of Paint Products

...can be shortened from months or years on a test fence to a few days in the...

ATLAS WEATHER-OMETER®

The natural weathering effect of sunlight, moisture, thermal shock and rain is reproduced on a highly accelerated basis in the Weather-Ometer. The cycle to be used is controlled by the Cycle Meter which automatically regulates the length of the exposure to light and moisture under controlled conditions of temperature. Available with automatic control of relative humidity permitting exposures under conditions simulating the formation of dew.

Results are positive and dependable and any test program can be duplicated and repeated at any time.

Following are a few of many users of Atlas Weather-Ometers:

Radiant Color Co.
National Lacquer & Paint Co.
Moran Paint Co.
Harrison Paint & Varnish Co.
John Lucas & Co., Inc.
Rust-Oleum Corp.
Benjamin Moore & Co.
Reardon Co.
Rinshed-Mason Co.
Tropical Paint Co.
Pittsburgh Glass Co.
General Electric Co.
E. I. Du Pont de Nemours & Co., Inc.
Glidden Co.
Cook Paint & Varnish Co.
Sherwin-Williams Co.

Write for complete engineering data on the operation of the Weather-Ometer

Sales representatives in principal cities throughout the world.

ATLAS ELECTRIC DEVICES CO.

4114 N. Ravenswood Ave., Chicago 13, Illinois U.S.A.

by reduction of drying and semidrying vegetable oils, said homopolymers being polymerized predominately by linking of the vinyl groups, the unsaturation originally present in the fatty alcohol being substantially present in the homopolymer.

Stripping Resin Paints

U. S. Patent 2,898,246. Alexander Hannah, Dearborn, Mich., assignor to Wyandotte Chemicals Corp., Wyandotte, Mich.

1. A process for removing oleoresinous, ester gum and alkyd resin based paints from articles coated therewith which comprises contacting said coated articles with a hot, aqueous paint stripping solution maintained at a temperature of about 200° F. and consisting of about 85 to 98 percent by weight of water and about 2 to 15 percent by weight of a stripping composition consisting essentially of at least about 70% by weight of sodium hydroxide, about 2 to 10 percent by weight of a polyhydric alcohol conforming to the formula

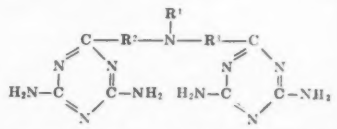
$$CH_2OH(CHOH)_nCH_2OH$$

wherein n has a value from 3 to 5, inclusive, about 2 to 4 percent by weight of a wetting agent selected from the group consisting of fatty acid soaps, rosin soaps, alkylarylsulfonates, petroleum sulfonates, sulfonated castor oil and mixtures thereof, and wherein up to about 25% by weight of said stripping composition is sodium carbonate.

Resinous Compositions

U. S. Patent 2,900,367. Tzeng Jiueg Suen, New Canaan, and Yun Jen, Stamford, Conn., assignors to American Cyanamid Co., New York, N. Y., a corporation of Maine.

1. A composition of matter which comprises a thermosetting condensation reaction product of one mol of (1) a compound having the general formula:

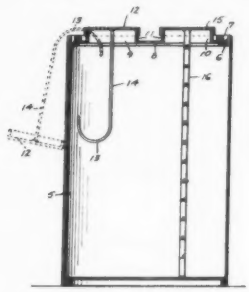


in which R^1 is a member selected from the group consisting of hydrogen, alkyl, aryl, and aralkyl radicals containing up to 30 carbon atoms, R^2 and R^3 each represents an alkylene radical containing up to 30 carbon atoms, and from about one to eight mols of (2) an aldehyde selected from the group consisting of formaldehyde, acetaldehyde, propionaldehyde, butyraldehyde, benzaldehyde and furfural, wherein the condensation reaction of said (1) with said (2) is carried out from about 40° C. to 100° C.

Paint Can Lid

U. S. Patent 2,898,006. William A. Taylor, Detroit, Mich.

The combination with a can having an annular channel formed in the upper end thereof, of a cover for said can, comprising a disc-like body, a depending annular rib formed on said cover adapted to seat in said channel sealing the cover,



said cover having a pouring opening spaced a substantial distance from the edge of said cover, an upstanding annular flange surrounding said pouring opening terminating a substantial distance above said channel and said disc-like body providing a pouring spout, a flanged cap for closing said pouring opening, said cap having a hook on the underside hereof adapted to extend into said can when said cap is in closed position and to engage over said upstanding flange when said cap is removed to prevent loss of said cap, said disc-like body having a second opening therein comprising an air opening, a second upstanding flange surrounding said second opening, a second cap for said second opening, and a measuring stick extending from the under side of said second cap adapted to extend into the can substantially to the bottom thereof when said second cap is in closed position.

Which successful paint companies use MILTON cans?

The cans shown represent just three of many successful paint companies which use MILTON cans. Like many others, these firms specify MILTON cans for two important reasons:

1—Dependable quality
2—Reliable delivery

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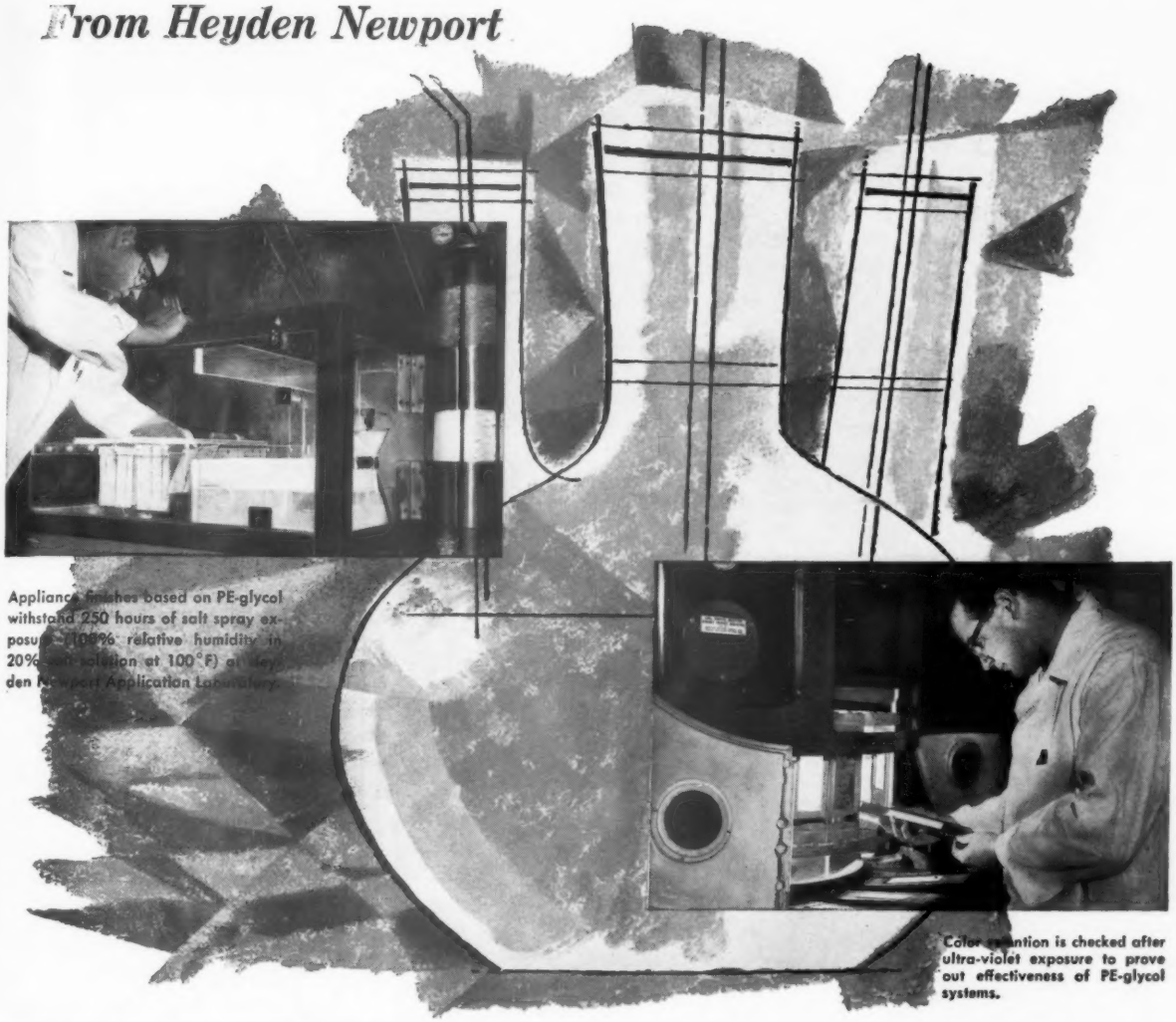
GEORGE A.
MILTON CAN CO., INC.
131 North 14th Street, Brooklyn 11, N. Y., EV 3-1100
Our 30th Year

From Heyden Newport



Appliance finishes based on PE-glycol withstand 250 hours of salt spray exposure—100% relative humidity in 20% salt solution at 100°F) at Heyden Newport Application Laboratory.

Color retention is checked after ultra-violet exposure to prove out effectiveness of PE-glycol systems.

Three new areas of PENTAERYTHRITOL application

Pentaerythritol is gaining new importance to paint chemists and allied chemical specialists as a result of development work at Heyden Newport. Check these three new areas that can be of profitable interest to you.

ALKYD EMULSIONS. The application advantages of latex paints plus the outstanding properties of the alkyd system is a combination offering formulators new sales potentials. Data are now available on the formulation and processing of PENTEK® based alkyd emulsions, excellent vehicles for water-based flat wall paints and industrial primers.

IMPROVED ALKYDS FOR FLAT PAINTS AND INDUSTRIAL FINISHES. Medium and short oil alkyd formulations—taking advantage of high quality, low cost PENTEK-glycol combinations—can be processed in standard equipment. Details on formulation and processing are available.

NEW HORIZONS. Pentaerythritol and its esters are finding increasing use in intumescent coating, plastic stabilizer, and plasticizer applications. Certain pentaerythritol derivatives are now showing considerable promise as lubricants and functional fluids.

1068

HEYDEN NEWPORT

Heyden Newport Chemical Corporation
342 Madison Ave., New York 17, N. Y.

Where tradition meets tomorrow in chemical progress

HEYDEN CHEMICAL DIVISION
Heyden Newport Chemical Corporation
342 Madison Avenue, New York 17, New York

Gentlemen:

- ☐ Please send data on the formulation of alkyd emulsions.
- ☐ Please send data on the formulation of Pentek-glycol alkyds.
- ☐ Please send PENTEK® Brochure.
- ☐ Please add my name to Heyden mailing list.

Name_____

Title_____

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New Developments

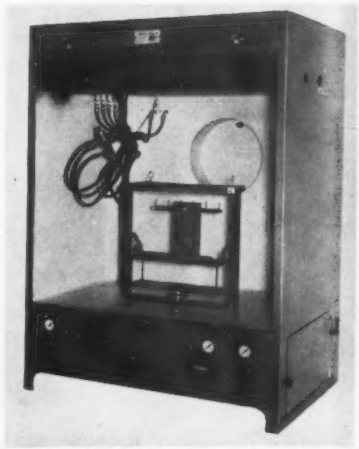
(*From page 118*)

New Spray Machine Paints Various Surfaces

An automatic spray machine which paints one, two or three surfaces of generally oval or rectangular shaped pieces of varying length, where fine mask definition and paint demarcation are imperative, has just been developed by Conforming Matrix Corporation.

An exclusive device, which embodies a foreshortened pivoting action, permits tilting of the overhead traveling guns in one or two directions as well as the painting in both directions when the part is in painting position. Paint coverage is assured under all mask bridging, and hard-to-reach recessions, corners and edges of the part, with a reduction in overtravel and a saving of paint. This tilting mechanism also permits the designing of machines of reduced length.

Standard gun mounting rods may be employed on this single vertical fixture machine, which is designated as Model SVF. The square shaft vertical fixtures alternately lower and raise the part, placing it snugly in the mask for painting. The fixtures are adjustable so as to paint a wide range of different sized parts which heretofore required special individual fixtures.



New spray machine measures 54″ x 36″ x 75″ high. Machine permits the length and speed of the painting stroke to be adjusted.

Entirely air operated, the SVF is housed in its own liberally sized booth which can be connected with the customer's existing exhaust system, or fan and motor can be supplied as an extra, if necessary. Air filtering cylinder and air valve lubrication and water trap ejector are all automatic.

•

Tung Oil Used In Paints and Varnishes

The secret ingredient, tung oil, which made famous the lacquers of ancient China, now can be used successfully in the commercial production of varnishes, floor sealers, and paint vehicles for modern-day use, according to the U. S. Department of Agriculture.

The Department's Agricultural Research Service, in cooperation with the Tung Research and Development League, has developed a new method for processing the tung oil vehicle that removes the danger of its gelling during cooking—the major drawback to a more widespread commercial use. The process, developed under the direction of ARS chemist Leo A. Goldblatt with the aid of the League's Research Fellow, Lucien L. Hopper, involves the addition of relatively small amounts of zinc resinate to control gelling or polymerization.

Brighton Synthetic Resin Kettles are skillfully engineered. Stainless Steel is specified for durability. Nearly a half century is reflected in the development of Brighton's modern reactors designed to handle a variety of alkyds, yet flexible enough to meet the demands of modern processing. Other basic components include the condenser, decanter-receiver, thinning tank, heating plant, and control board.

Consult Brighton Engineers for complete details on our synthetic reactors.

BRIGHTON

METALSMITHS EST. 1914

CORPORATION

820 STATE AVENUE · CINCINNATI 4, OHIO

Pilot plant development of the process and demonstration of its commercial possibilities were carried out at the ARS Southern Utilization Research and Development Division, New Orleans.

Tung oil has been recognized and used for centuries as a "super" drying oil. It dries rapidly and gives extreme toughness, water resistance, and high gloss to coatings in which it is used. But the tendency of tung oil to gel and form an insoluble, rubber-like mass when processed for the necessary time at the high temperatures required to insure smooth, wrinkle-free finishes has plagued the paint and varnish industry, despite its almost ready-made market for extremely tough and water-resistant coatings.

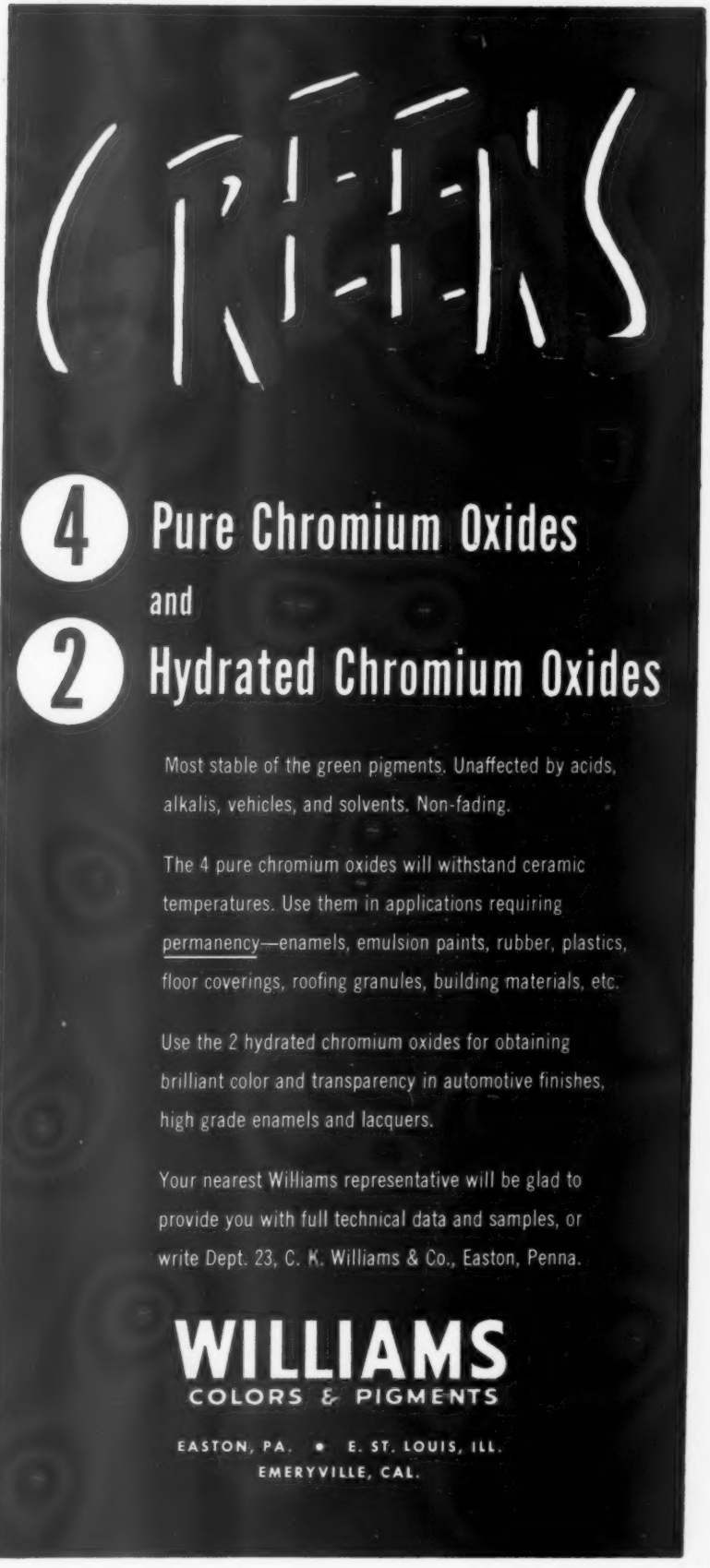
•

General Electric New Silicone Resin

Through the use of a new silicone resin from General Electric's Silicone Products Department, both indoor and outdoor flood lamps are said to be now able to offer superior and more reliable lighting performance with less power.

Designated as SR-119, this resin is used in a special silicone lens coating developed jointly between General Electric's Large Lamp and Silicone Products Departments. Recently introduced on G-E's new line of PAR-38 colored flood lamps, it eliminates many problems associated with previous lens coatings and offers a number of advantages to lamp users and manufacturers.

In addition to the inherent silicone characteristics of resistance to heat and weathering, SR-119 also offers superior hot hardness, rapid cure and excellent adhesion to glass. Used as a lens coating, it is baked on the glass face of the lamp and is able to transmit more light output per watt for richer and truer color. For this reason, projector bulbs in G.E.'s new line of PAR-38 lamps operate on only 100 watts as compared with their former line of 150-watt colored lamps. To the lamp user this means improved and yet less expensive lighting performance than was previously available. To the manufacturer, this new lens coating provides rapid cure for more versatile baking schedules and efficient lamp production.


4 Pure Chromium Oxides
and
2 Hydrated Chromium Oxides
Most stable of the green pigments. Unaffected by acids, alkalis, vehicles, and solvents. Non-fading.
The 4 pure chromium oxides will withstand ceramic temperatures. Use them in applications requiring permanency—enamels, emulsion paints, rubber, plastics, floor coverings, roofing granules, building materials, etc.
Use the 2 hydrated chromium oxides for obtaining brilliant color and transparency in automotive finishes, high grade enamels and lacquers.
Your nearest Williams representative will be glad to provide you with full technical data and samples, or write Dept. 23, C. K. Williams & Co., Easton, Penna.
WILLIAMS
COLORS & PIGMENTS
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EMERYVILLE, CAL.

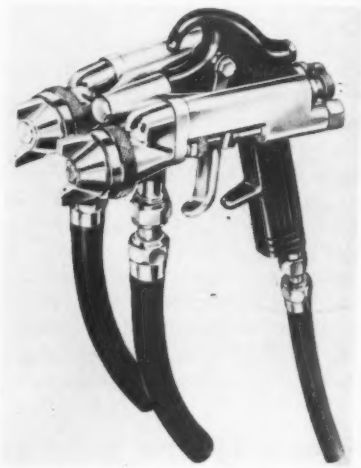
In addition, a serious problem with previous outdoor flood lamps is now eliminated—that of cracking and shattering of the lens during rapid temperature changes. Due to the high degree of expansion and contraction normally experienced with outdoor lamps, a need has continually existed for an all-weather unit. This is now made possible with a lens coating that will resist the high temperatures developed during continuous operation and yet not be affected by exposure to rain, snow, sleet and other adverse weather conditions when in use.

Based on initial success of this silicone resin used in the new line of G-E flood lamps, company officials are very optimistic concerning its potential as a coating for high-temperature equipment such as ovens, range components, space and wall heaters, processing tanks and incinerators. Additional information on this resin can be obtained from the silicone Products Department, Dept. PVP, General Electric Company, Waterford, N. Y.

•

Inexpensive Spray Machine Offered by Binks Mfg. Co.

A two-headed spray gun with high performance but low cost has been developed by Binks Manufacturing Co., Chicago, Ill., leading spray painting equipment manufacturer. The gun represents a first in the low-cost plural component spraying equipment field,



New, two-headed spray gun, is designed to offer users the benefits of low cost, high quality spraying. Close-up view shows three hose arrangement, single trigger action.

and offers users the benefits of high efficiency spray application without involving excessive costs.

Designed primarily for the application of polyester resins where the accelerator mixture must be brought into contact with the catalyst mixture immediately before the mixture impacts the work surface, the gun can also be put to other uses. An example is in spattering or veiling where two different materials can be sprayed with each pass of the gun. The gun can be used for almost any two-component finishing system where perfect mixing is not required.

Designated the Model 181, the gun uses standard Binks Model 18 gun nozzles. Users may specify air and material nozzle sizes when ordering to suit their individual requirements. Some applications may necessitate the use of two different size nozzles, depending on the viscosity of the material being sprayed and the ratio of material quantity.

Gun body is of drop forged aluminum. Gun heads are ordinarily of drop forged bronze, but stainless steel heads are available. Needle stroke is controlled at the gun handle, as with standard guns, and spray patterns of each gun may be regulated from round to fan, with intermediate configuration.

From Baker to the Coatings Chemist

economical Castor Polyols as building blocks for quality Urethane coatings

As building blocks for quality urethane coatings, Baker castor polyols offer two-way economy. Not only are they low-cost themselves, but they permit the use of low-cost aromatic solvents in formulating these modern finishes. Furthermore, this economy is brought about while maintaining performance equivalent or superior to that given by competitive polyols.

Castor polyols, now in use by many chemists, impart these qualities to urethane coatings:

- **Remarkable flexibility and hardness**
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- **Superior color retention**

Baker offers a wide choice of castor polyols for *your* specific job in urethane coatings, whether for leather, paper, wood, metal or other substrates. Being mutually soluble with each other, castor polyols may be blended for selected properties. For technical advice on these polyols, consult Baker today.

THE Baker CASTOR OIL COMPANY
ESTABLISHED 1857
Bayonne, New Jersey

TECHNICAL Bulletins

ISOBUTYL ALCOHOL

The use of isobutyl alcohol as a solvent and chemical intermediate is the subject of a new booklet enentitled, *Eastman Isobutyl Alcohol.*

An active solvent in the presence of easters or ketones, isobutyl alcohol reduces the solution viscosity of many lacquer-base materials including systems based on nitrocellulose, ethyl cellulose, and cellulose acetate butyrate. The effect of isobutyl alcohol on the solution viscosity of various polymeric materials and the retarding effect on the evaporation rates of medium-boiling ester solvents is also presented in tabular and graphical form.

In addition, the booklet describes the use of isobutyl alcohol as a chemical intermediate in the preparation of plasticizers and hydraulic fluids, and as a gasoline additive.

Eastman Chemical Products, Inc., Dept. PVP, Kingsport, Tenn.

WET GROUND MICA

Wet ground mica decreased the burning losses and increased fire retardancy in paints, according to studies made at New York University under the supervision of Dr. Max Kronstein, senior research scientist.

The test paints and the testing procedure were based on the principles of Federal Specifications TT-P-26a (13 Jan. 1954) and TT-P-0034 (Army) (5 Mar. 1957) for interior and exterior fire retardant paints respectively.

Paints with and without wet ground mica were compared.

In each case, the sample with wet ground mica showed improved fire retardance and decreased loss of weight. The studies indicate that the beneficial influence of the wet ground mica is fire retardant paints.

This study is reported in detail in Technical Bulletin No. 39.

Wet Ground Mica Association, Dept. PVP, 420 Lexington Ave., New York 17, N. Y.

has widespread applications

This basic, versatile chemical is used in the formulations of
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FORK TRUCK

Specifications and construction features of the C-20 Pneumatic fork truck are contained in a four-page color brochure. The machine is a gas powered, pneumatic tire truck of 2000 lbs. capacity designed for handling and tiering over rough floors in congested areas.

Drawings indicate dimensions, turning radius and upright heights. Tables give load capacities and stacking ability. Sketches illustrate various uses of the machine, and brief copy explains operational advantages. Industrial Truck Div., Clark Equipment Co., Dept. PVP, Battle Creek, Mich.

FLAMMABLE LIQUIDS

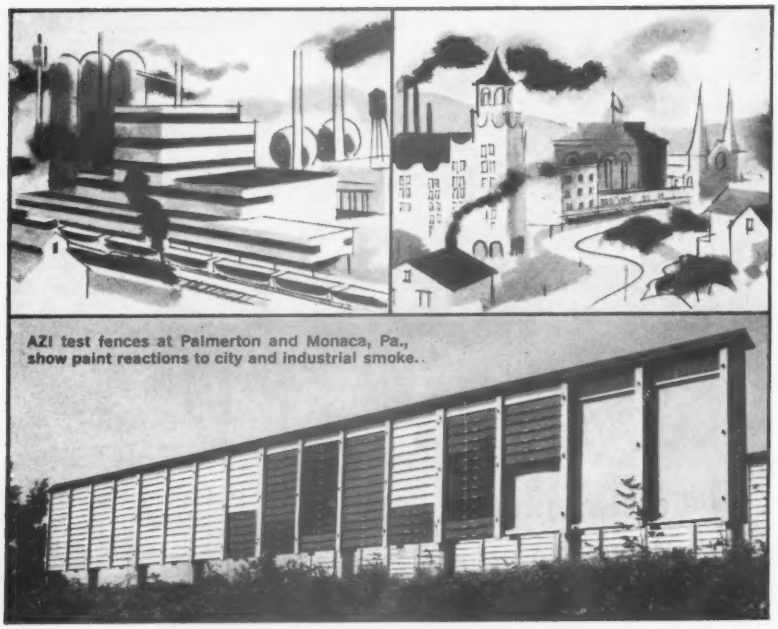
Just published is a practical working guide to the safe handling and application of flammable liquids in the production and maintenance operations of modern industrial and chemical plants. It gives a clear outline of the problems involved in the use of flammables in individual processes, and describes the methods and equipment required for safe control and use from receipt on the premises in original containers or drums, through each process or application, to final disposal.

The catalog presents a clear, concise statement of the physical properties and characteristics of the most commonly used flammables and describes the engineering principles and methods by which these hazardous liquids are controlled in specially designed containers and dispensers for complete worker and plant protection from disastrous flash-fires and explosions.

Divided into six general plant operating sections for quick, convenient reference. Each section contains recommendations for the safe, convenient use of hazardous liquids and guides to selecting the proper types of equipment. Protectoseal Co., Dept. PVP, 1920 S. Western Ave., Chicago 8, Ill.

New tests in Pennsylvania measure paint reactions to

INDUSTRIAL *and* **CITY SMOKE**



AZI test fences at Palmerton and Monaca, Pa., show paint reactions to city and industrial smoke.

Research by AZI helps you improve paint formulations

Additional fences have been set up near heavy industrial areas in Pennsylvania as part of AZI's nation-wide study of paints. This study will show how paints react to the deteriorating effects of sun, smoke, dirt, and soot. They will show the levels of zinc oxide that best improve paint durability, tint retention, non-chalking action, and resistance to mildew.

Improvements like these in paint quality often result in greater sales—and profits; yet added levels of ZnO provide these improvements at only a fractional part of the total cost of the paint.

If you would like to be informed of the progress and results of all tests in the study, write: American Zinc Institute, 60 East 42nd Street, New York 17, N. Y.

AZI **AMERICAN ZINC INSTITUTE, INC.**

60 East 42nd Street, New York 17, N. Y.

CLUSTERS

Bulletin DC-1, *Selas Duradiant Clusters Assure Speed, Economy, Quality in Heat Processing Liquids*, now available.

The 12-page bulletin introduces ten benefits that can be gained by using Duradiant clusters for heat processing: resins, varnishes, oils, inks, greases, chemical solutions, acids, alkalis, concentrations, polymerizations, organics, fatty acids, essences and esters.

The bulletin is profuse with photographs of outstanding installations of all types and schematics of different heating applications. It explains in detail the heating operations possible with Duradiant burners, how clusters permit a wide variety of heat patterns, the separate advantages of enclosed and open Selas clusters. The use of manually adjusted combustion systems and how to obtain the most accurate temperature control are covered in full.

To help answer many of the other problems involved in processing liquids, space has also been given to inert gas generators, flo-scopes, liquid separators, dehydrators, vape-sorbers and liqui-jectors.

Selas Corp. of America, Dept. PVP, Dresher, Pa.

COLORIMETER

A brochure on Color Eye Model D has been published.

Features, technical specifications, production use, and laboratory use are discussed. An optical schematic is also included.

Instrument Development Laboratories, Inc., Dept. PVP, 67 Mechanic St., Attleboro, Mass.

FATTY ACIDS

A new revised edition of the catalog *Fatty Acids in Modern Industry* has just been issued.

The catalog includes up-to-date specifications on the complete line of GROCO stearic and oleic acids, tallow fatty acids and glycerides, coconut and other vegetable fatty acids and glycerine; a chart showing the component fatty acids in these products; and a list of the standard analytical test references used in the industry.

Most of the revisions in specifications and composition reflect improvements which have been made in GROCO fatty acids since the last edition of the catalog was issued early in 1958.

A. Gross & Co., Dept. PVP, 295 Madison Ave., New York 17, N. Y.

GRINDING RODS

Publication of a new brochure describing the outstanding qualities of high density Diamonite grinding rods has been announced.

In addition to pointing out the impact strength and wear resistance of Diamonite tods, the four-page catalog cites case histories where greater production with lower operating costs have been achieved in the paint and ceramic industries with Diamonite high density grinding media.

Diamonite Products Manufacturing Compant, Dept. PVP, Shreve, Ohio.

CLEANERS

A new four-page folder describing the companies' line of portable blower-vacuum cleaners is now available.

Included are hand-portable units in 1-1/3, ¾, ½, and 1/3 horsepower sizes, a heavy duty tank-type model, a new drum conversion unit for wet or dry pickup, a commercial "canister" type for dry pickup only, together with more than 80 brushes, wands, sprayers and other cleaning attachments.

Ace-Sycamore, Inc., Dept. PVP, 448 Dekalb Avenue, Sycamore, Ill.

AUTOMATIC FRACTIONATOR

An automatic fractionator that collects effluents by timed flow, volumetric, and drop count methods—pressurized paper chromatography systems capable of gram scale separations of all mixtures separable by ordinary paper chromatography on a micro-scale—an ultraviolet absorptiometer—paper and column electrophoresis equipment for physical chemistry are featured in a new six-page, two-color folder.

In addition to the above, the "MiniFlow" constant velocity micropump designed particularly for chromatographic operations is illustrated and described. It is pointed out that the all-glass, self-rinsing-piston pump system makes the "MiniFlow" ideally suitable for the pumping of most clear liquids regardless of their chemical composition. A conductivity analyzer for the continuous measurement of conductivity in flowing solutions, and a conductivity bridge also are included. Ivan Sorvall, Inc., Dept. PVP, Norwalk, Conn.

PUBLICATIONS LIST

The American Society for Testing Materials *List of Publications*, listing standards, symposiums, indexes, proceedings, and special publications, has been made available.

The brochure includes a complete list of current publications on engineering materials, including some to be issued shortly.

The American Society for Testing Materials, Dept. PVP, 1916 Race St., Philadelphia 3, Pa.

WHAT DO YOU FIND IN A BARREL OF HERCULES® NITROCELLULOSE?

160 lbs. of nitrocellulose
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Reporting the results of our continuing research and development work kept up to date by constant revision.

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On behalf of all customers, to aid in acceptance of lacquer on military items, to assist in preparing specifications, and to demonstrate the advantages of lacquer finishing systems and methods.

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For more efficient application of lacquer, including design engineering and suggestions for improvement where indicated. The results of this evaluation, testing, and demonstration program are available to all.

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End-use demonstration, market analyses, furniture tags, and rate and shipping services.

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CL60-2

GLYCOL-ETHER SOLVENTS

New 40-page booklet, describing the properties and uses of "Cellosolve" and "Carbitol" glycol-ether solvents, has just been published.

The booklet contains comprehensive data for 14 glycol-ether solvents, including physical properties, chemical derivatives, end-use possibilities, storage and handling, physiological properties, specification limits, and test methods. A detailed bibliography and reference section is included.

The glycol-ethers are miscible with the most liquids, and are mild-odored solvents for resins, oils, waxes, fats, dyestuffs, and other organic materials. They are used as solvents in lacquers, enamels, and non-grain-raising wood stains. The glycol-ethers have been established as dye solvents in the textile, leather, and printing industries, as solvents for insecticides and herbicides, and as diluents for hydraulic brake fluids. They are used in "soluble" oils, specialty cleaners, and other soap-hydrocarbon systems.

As chemical intermediates, the glycol-ethers can be esterified, etherified, chlorinated, or otherwise modified at the reactive hydroxyl group. Union Carbide Chemicals Co., Dept. PVP, E. 42nd St., New York 17, N. Y.

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ACETOPHENONE

New data on the reactions and pharmaceutical applications of acetophenone are outlined in a 12-page bulletin just issued by Union Carbide Chemicals Company, division of Union Carbide Corporation.

Acetophenone is widely used for its solvent and odorant properties and, because of the reactivity of its aryl, carbonyl and methyl groups, as an intermediate in the synthesis of a broad range of compounds.

Physical properties, specifications, shipping data and graphs of solubility, vapor pressure and specific gravity, are tabulated in the bulletin.

Union Carbide Chemicals Co., Dept. PVP, 30 E. 42nd St., New York 17, N. Y.

CELLULOSE ACETATE

Cellulose acetate for protective coating formulations is the subject of a 35-page illustrated brochure now made available by Eastman Chemical Products.

The various types of cellulose acetate are discussed in terms of their general properties, solubility in various solvents and solvent combinations, and compatibility with plasticizers, resins, and other modifying materials. The brochure lists typical uses of cellulose acetate as a film-former in the protective and decorative coating of paper, metals, plastics, glass and fabrics; and presents detailed information on selection of particular types to meet specific application requirements.

Eastman Chemical Products, Inc., Dept. PVP, Kingsport, Tenn.

PROTECTIVE COATINGS

New brochure describes properties and use of "Alpex" as a very valuable tool for the protective coatings formulator. Its value in the formulation of highly chemical resistant coatings is explained in detail. The information given was gathered over a period of 15 years, and stems from extensive field experience and numerous and carefully made laboratory evaluations by experts in the field.

Alkydol Laboratories Div., Reichhold Chemicals, Inc., Dept. PVP, 3242 South 50th Ave., Cicero 50, Ill.

CORROSION PREVENTION

New manual on corrosion prevention prepared by the U. S. Navy's Bureau of Yards and Docks for its personnel engaged in construction, operation, and maintenance of naval shore facilities has been published.

Data are assembled on atmospheric, submerged, and subsurface corrosion, and corrosion on areas alternately wet and dry. What the Navy has found to be the most practicable methods and materials for controlling or minimizing corrosion are described in detail.

Among corrosion processes discussed are those caused by use of dissimilar metals, with particular emphasis on the Electromotive Force Series and galvanic corrosion, direct chemical attack, stray currents, microbiological and atmospheric attack, and marine corrosion.

Such methods of corrosion control are outlined as the use of nonmetallic materials and coatings, claddings, and coverings; passivity; change of environment to reduce exposure to corrosion through the use of passivators or inhibitors, underground backfills, and combinations of zinc and iron in hot water facilities.

One section presents a selection of material combinations and a selection of metals with a discussion of polarization; another gives a complete discussion on cathodic protection and electrochemical processes.

The 431-page manual, PB 151756 *Corrosion Prevention*, Office of the Chief of Civil Engineers, Bureau of Yards and Docks, U. S. Navy, December 1956, may be purchased for $6.00 from OTS, U. S. Department of Commerce, Washington 25, D. C.

LIQUID LEVEL CONTROLLER

New liquid level controller, "Versa-Tran," gives low cost, high precision level control for any electrically conductive liquid with a resistance below 25,000 ohms. This fully transistorized, electronic amplifier relay is described in a new 4-page, illustrated folder. Minneapolis-Honeywell Regulator Co., Dept. PVP, Wayne and Windrim Avenues, Philadelphia 44, Pa.

COPOLYMERS

A bulletin, entitled *PVP/VA Copolymers*, has been made available.

The booklet lists the properties, specifications, and uses of this new series of vinylpyrrolidone/vinyl acetate copolymers.

Antara Chemicals, Dept. PVP, 435 Hudson St., New York 14, N. Y.

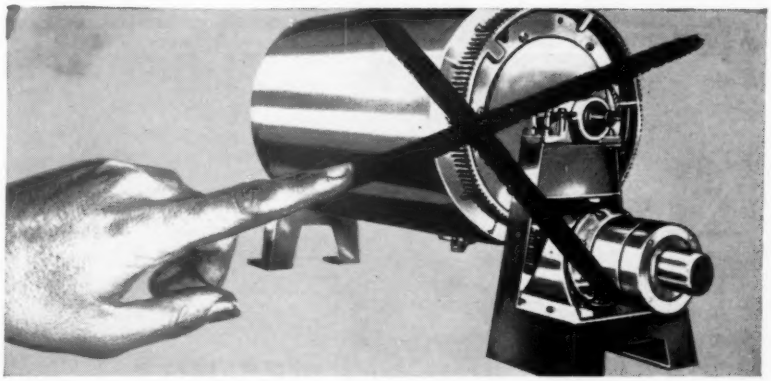
PUMPS

New eight-page bulletin illustrates and describes the latest features incorporated in new turbine type pumps.

Included in the bulletin are: exploded views, selection tables, limitation charts, dimensions, construction specifications, and detailed engineering-architects specifications.

The new line of pumps are said to have a capacity range up to 150 gpm, pressures to 300 psi, and temperatures to 275 F.

They are recommended by the company for applications such as: boiler feed, condensate return, fresh water service, brine service, ice water circulation, filter service, LPG service, transfer service, caustic liquid handling, sprinkler service, spraying service, water treatment, and booster service. New York Air Brake Co., Dept. PVP, Aurora Pump Div., Loucks St., Aurora, Ill.



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PALLET TRUCK

A new circular describing a 2000-lb. capacity lightweight hydraulic pallet truck is now available.

Designated as Circular 26C, the four-page presentation contains illustrations, specifications and unique operating details on the new HPF pallet truck.

Lewis-Shepard Products, Inc., Dept. R9-24/PVP, 125 Walnut Street, Watertown 72, Mass.

FORK LIFT TRUCKS

Outstanding engineering developments, and unusual construction and operating features of fork lift trucks are pictured and described in interesting detail in a new booklet on materials handling equipment just released.

Lift truck components outlined in the manual include heavy-duty industrial-type engines — specially engineered for the rugged stop-and-go driving involved in most materials handling applications; plus a stationary-type load axle that carries all deadweight to protect the differential from stress and strain; and smooth torqmatic drive which substantially reduces driver fatigue and cuts down lift truck maintenance costs.

Among the features covered are a pivotal-mounted steering axle that gives increased maneuverability and load stability; an extra tough electrically-welded all-steel frame and a counterweight of advanced design—styled to provide minimum turning radius for large-capacity units. Towmotor Corp., Dept. PVP, 1226 E. 152nd St., Cleveland 10, Ohio.

FORK LIFT TRUCKS

Creative lift truck engineering, new functional styling and improved operating features embodied in a new "Pace-Maker" Series of fork lift trucks, are discussed in a colorful new booklet called *The Inside Story*, currently available to lift truck users.

One of the most interesting design-engineering advances outlined in the 24-page illustrated manual is a new "centralized" system of lift truck controls, based on actual motion studies, which places all steering, shifting and hydraulic control levers within a 6-inch radius—for increased operator efficiency, and greater driver comfort.

Other outstanding lift truck developments covered in the booklet include latest type control valves which can be serviced while in position, and only need to be removed for replacement or major overhaul; heavy-duty full-floating brake shoes with bonded linings that eliminate rivet scoring and give longer brake life; and a vertical transmission arrangement that saves space and provides added accessibility to parts. Towmotor Corp., Dept. PVP, 1226 E. 152nd St., Cleveland 10, Ohio.

POLYAMIDE RESINS

New four-page informational sheet gives preliminary technical information on polyamide resins which impart thixotropy and body to oil-based paints. They also may be used as gelling agents for other organic systems, in the formation of adhesives; in the preparation of flexographic inks and overprint varnishes; and as modifiers in epoxy resins.

The new sheet covers typical properties and applications of the resins, shipping information and a chart outlining solubility data in various common solvent systems.

Organic Chemicals, Olin Mathieson Chemical Corp., Dept. PVP, 745 Fifth Ave., New York 22, N. Y.

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ESPESOL SOLVENTS'

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Save on Freight Costs Smaller, multi-product orders are shipped in compartment lots by tank car, transport truck, barge, and ship and enjoy bulk rates.

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"Package" Delivery Ideal for Small Buyers Combining small lots into one shipment reduces purchasing agent's work, simplifies unloading and handling, and insures all products arriving at one time to minimize production delays.

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CUSTOM PRODUCTION

New bulletin is available on extensive biochemical and chemical facilities for custom production. Booklet says that the unit processes available are amination, condensation, esterification, fermentation, hydrogenation, hydrolysis, nitration, oxidation, and reduction. Unit operations include all types of modern equipment in current research and commercial use. Commercial Solvents Corp., Dept. PVP, 260 Madison Ave., N. Y. 16, N. Y.

SUCROSE DERIVATIVES

New brochure contains information regarding the nature and uses of sucrose acetate isobutyrate (SAIB).

Of particular interest to coatings formulators, the brochure discusses the use and effect of sucrose derivative as a modifying extender in a variety of lacquers and melt coatings. Also included are solubility and compatibility data. Eastman Chemical Products, Inc., Dept. PVP, Kingsport, Tenn.

ALUMINUM COATINGS

New folder describes advantages of new 1100 TMV resin in formulating colored aluminum coatings.

Stating that coatings formulated with the new resin can now be readily brushed, rolled or sprayed, the folder also illustrates how the brilliance and durability of aluminum combined with the added interest of color, opens new marketing possibilities for paint manufacturers.

The folder lists eleven specific advantages gained by colored aluminum paint when 1100 TMV is used as the principal binder. Marbon Chemical Div., Borg-Warner Corp., Dept. PVP, Box 68, Washington, W. Va.

DUMPING EQUIPMENT

Dumping equipment that will lift and dump any container is described in a new catalog.

The brochure has a handy selector chart to facilitate choosing the right equipment for handling loads to 5,000 pounds at dumping heights up to 50 feet.

Four basic models are shown, each available in designs to accomodate drums, barrels and boxes.

Conveyors and Dumpers, Inc., Dept. PVP, P. O. Box 567, West Caldwell, N. J.

CURING AGENT

A technical bulletin containing a summary of performance, data on physical properties, shipping, hardness, tensile strength, compression strength, heat and chemical resistance, heat distortion, applications, epoxy-polysulfide combinations, and toxicity and handling information of the new curing agent S-1 has been made available.

Industrial Chemicals Division, Pennsalt Chemicals Corporation, Dept. PVP, 3 Penn Center, Philadelphia 2, Pa.

ACROLEIN

A new 22-page bulletin, entitled *Acrolein—Its Chemistry and its Applications*, has been made available.

The bulletin discusses the chemistry of acrolein, gives recommendations for safe handling in the laboratory, and lists physical properties.

Shell Chemical Corp., Market Development Dept., Dept. PVP, 50 West 50th St., New York 20, N. Y.

PRIMER SEALERS

All About Primer Sealers is a new booklet discussing the purpose of paint primer sealers, the three basic types available and their application to various surfaces.

William Zinsser & Co., Dept. PVP, 516 West 59th Street, New York 19, N. Y.

With other transparent colors, and used with non-leafing aluminum or over a reflecting surface, the possibilities for *R-B-H Midas Gold* and *Aurelian Bronze* are a challenge to the imagination of the formulator. Both golds are

1. Transparent
2. Permanent
3. Inorganic
4. Economical to use

We suggest *Midas Gold* for nitrocellulose, synthetics and some automotive-type acrylic systems. Use *Aurelian Bronze* in vinyls and in nitrocellulose where a slight bleed can be tolerated or may prove advantageous.

Write for our folder and samples.

R-B-H Dispersions

INTERCHEMICAL CORPORATION
Color & Chemicals Division
HAWTHORNE, New Jersey

Pigment dispersions in nitrocellulose; ethyl cellulose; urea formaldehyde; vinyl and alkyd resins; chlorinated rubber and other plastic binders.

R-B-H, MIDAS GOLD AND AURELIAN BRONZE ARE TRADEMARKS OF INTERCHEMICAL CORPORATION

New Books

Techniques of Plant Maintenance & Engineering

Published by Clapp & Poliak, Inc., Dept. PVP, 341 Madison Ave., New York 17, N. Y. 266 pages. Price $10.

The tenth volume in the annual series *Techniques of Plant Maintenance & Engineering* is the most comprehensive of those published in the past decade.

The volume contains all papers read at the 1959 Plant Maintenance & Engineering Conference held in Cleveland last January.

One of the major features of the book is the vast number of practical situations it covers. Included are answers to 1,056 questions submitted by engineers attending the conference. More than 70 charts, graphs and diagrams are reproduced.

Particularly valuable are reports of sessions confined to single industries. These include discussions on maintenance in nuclear plants, research and development laboratories, abrasive product plants, foundries, pulp and paper mills, assembly plants, chemical plants, electrical manufacturing plants, metal working and metal fabricating plants, and petroleum refineries.

Other subjects include: Our Maintenance Management System, Industrial Engineering in Maintenance, Maintenance Materials, Maintaining Control Systems, A Successful Case in Planning and Scheduling, Economical Use of Electric Power, Setting and Maintaining Sanitation Objectives, Why Safety Is Essential and How to Secure It, Preventive Maintenance, Arc Welding in Maintenance, Maintaining Plant Utilities, Basic Procedures in Building Maintenance, Training Fundamentals, Labor Relations in Union Shops, Counteracting Air and Water Pollution, Lubrication, Maintenance By Outside Contractors, and three sessions on maintenance in plants with up to 50 maintenance employees, up to 300, and over 500.

Hot Organic Coatings

By Raymond B. Seymour Published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. Price $7.50.

The constitution, applications and properities of hot organic protective coatings are concisely presented. The book contains chapters on widely used hot organic materials such as asphalt, coal tar pitch, petroleum waxes and cellulose derivatives. Specific information of formulations of proprietary products is included. Additional chapters deal with hot melt applications without solvent such as peel coatings, protective linings, flame spraying and the fluidized bed process.

Analytical Chemistry of Polymers

Edited by Gordon M. Kline, Part I, Analysis of Monomers and Polymeric Materials, Interscience Publishers, New York, 666 pages. Price $16.50.

This book brings together information on the analytical methods that have proved useful in the testing of commercial monomers and polymers.

For each of the major industrial types of polymers, methods are described for the assay and determination of pertinent impurities in the monomers; this is followed by a discussion of analytical problems involved in the identification and characterization of the chemical composition and physical properties of the polymers. Special chapters have been included to deal with the identification and analysis of plasticizers, ion exchange resins, textile fibers, natural and synthetic rubbers, protein polymers, natural resins, and drying oils submitted by various experts in the paint field.

Generally, procedural details are supplied for the analyst only in the case of previously unpublished tests or modifications of well-known tests for the particular requirements of monomer or polymer analysis; otherwise, the principal features of the method and equipment are presented in abbreviated form and the reader is referred to the original literature for the detailed directions.

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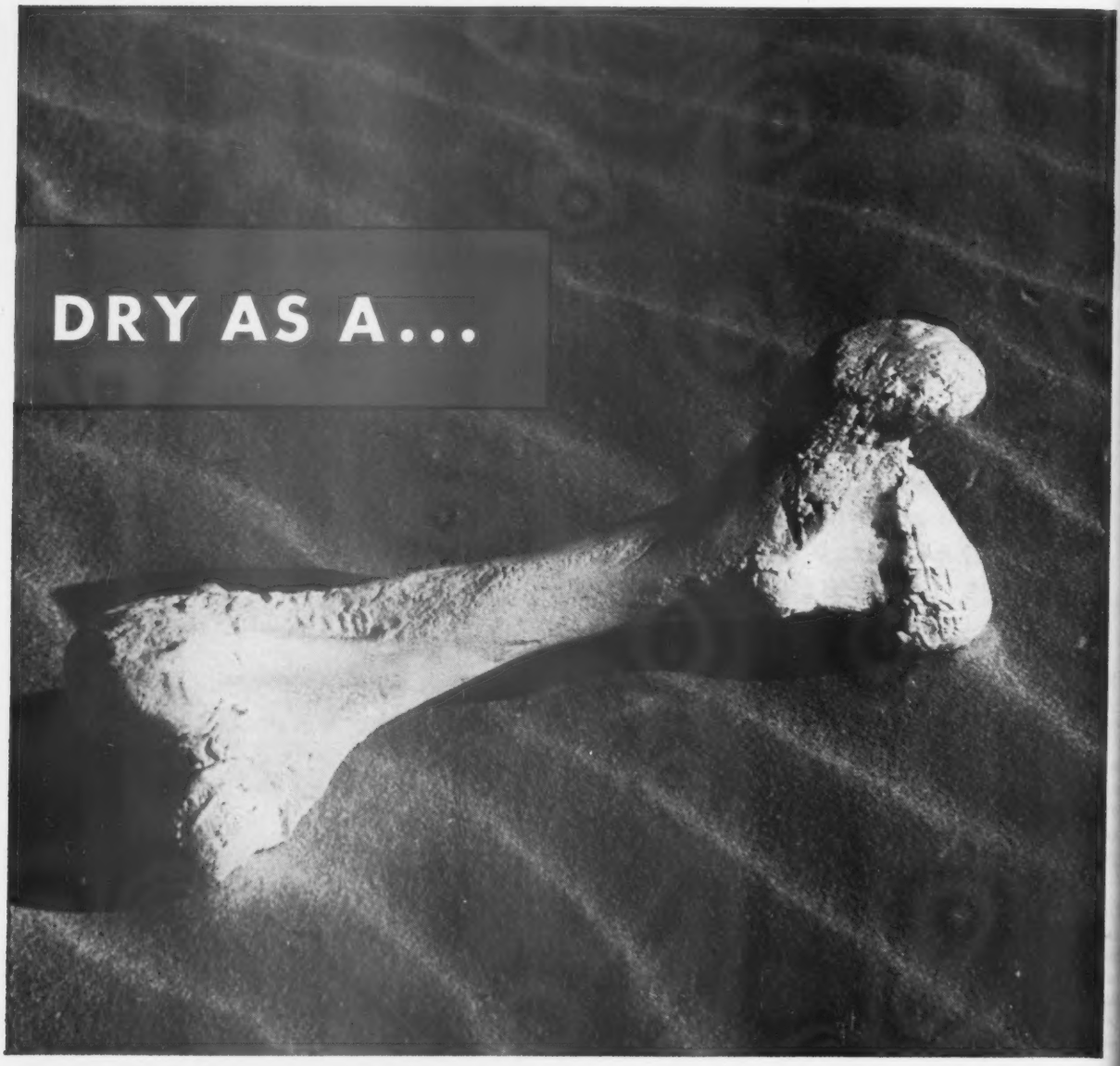

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Paint Industry in Italy

Outlook for German Paint Industry

Packaging operations of Montecatini's modern Avigliana paint plant in Northern Italy, where a complete line of products are manufactured. See page 149 for an interesting discussion of the present status of the paint industry in Italy.

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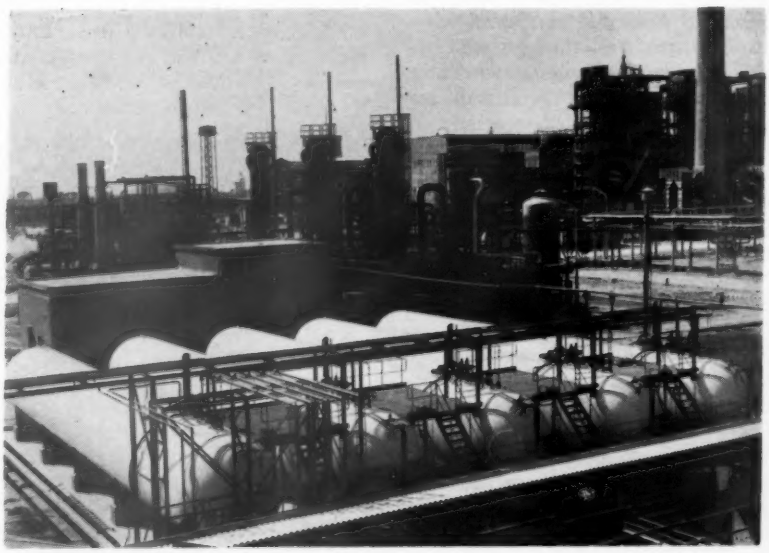
THE PAINT INDUSTRY IN ITALY

Hampered by inadequate supplies of necessary raw materials, the Italian paint industry is counting on vigorous research for its progress and development.

A DISCUSSION of the present trends and developments taking place in the paint industry in Italy presupposes an exact knowledge of what is being done or investigated in the more than 600 paint plants manufacturing a wide variety of products for industrial and home consumption. This is not an easy undertaking, since many of the research laboratories are rather reluctant to discuss their achievements because of the strict competition that exists among Italian paint producers. Well known to all, however, are the objectives on the part of coating manufacturers to solve the problems presented to them by industrial users which require special raw materials.

Within the past decade, through vigorous research coupled with a fast recovery from the ravages of war, the Italian paint industry was able to increase its production output to a level which satisfied most domestic demands excepting in a very few cases when it became necessary to import certain specialized finished paints.

Italy is, however, poorly provided with the raw materials needed to produce modern coating products—so much so that it can be said that not less than 70% of a high quality enamel for refrigerators, for example, consists of ingredients from abroad. Synthetic resins, though produced in Italy, are made from imported raw materials such as pentaerythritol, naphthalene, etc. Nitrocellulose is made from Egyptian linters or Scandinavian cellulose. Titanium dioxide is imported. Solvents and thinners, even those derived from petroleum products, come from foreign raw materials. It is quite obvious that without importing these raw materials, the Italian paint industry would be destined to extinction. This situation illustrates and justifies the pressing need of research, so important to the progress of the Italian paint industry. The threat of being outdone by foreign concerns, the necessity of competing in the European Common Market



A view of the manufacturing facilities of ANIC Ravenna. This particular plant using methane as a raw material produces 65,000 tons of synthetic resin annually.

The information presented in this article was provided by Dr. Emanuele Recchia, a prominent Italian paint technologist.

Mixing and grinding operations of Montecatini's Aviglina paint plant.

under the handicap of adequate supplies of raw materials are some strong factors in spurring research activity in the coatings field.

Here is a rundown of recent development and trends taking place in the various segments of the paint industry in Italy.

Anti-corrosives

Red lead in linseed oil have almost totally disappeared. Anti-corrosive paints are mostly composed of lead zinc chromates in synthetic vehicles which lend themselves to spray application and are fast drying. Lead cyanamide, after a very active beginning, has limited applications to steel structures such as bridges, cranes, unloading wharves, building machinery, etc. However, metallic zinc-base coatings give excellent exterior results, especially on tanks and tubing exposed to an industrial or marine atmospheres, and interior applications for storing and transporting fresh water. Epoxy-amino vehicles show excellent results especially in adhesion to sandblasted iron. Wash-primers, not actually considered corrosion-resistant, but rather as an adhesive undercoat, find considerable use as primers for air-drying or baked coatings, especially in the metal furniture industry. In the protection of ships, this application is gradually being taken over by other products less susceptible to the saponifying action of seawater. New types of corrosion-resistant coatings have been recently introduced, expressly processed for application to heavily rusted surfaces via wire brush.

Oil paints are being used less frequently. Even for the protection of steel railings and building accessories, synthetic types are displacing the oil types.

Air-Drying Synthetic Enamels

The most common synthetic enamels are those with alkyd resin bases. Resin firms supply small and middle-sized paint manufacturers, who lack cooking facilities, with special types of resins. Thixotropic alkyd resin base paints made up in tubes for household use have recently made their appearance, but have not met with any particular success. Another interesting product is aerosol paints for retouching automobiles, motor scooters and refrigerators. The painting and maintenance of railroad coaches and streetcars call for large consumption of corrosion-resistant and air-drying synthetic enamels.

Chlorinated rubber, used until recently as an acid-resistant coating, is extending its use because of its easy application, fast drying, and good durability characteristics. Styrene copolymers find frequent use in the preparation of fast-drying enamels. In the finishing and coloring of pressed plastic parts, acrylic coatings and enamels have been found to be particularly successful.

Waterpaint

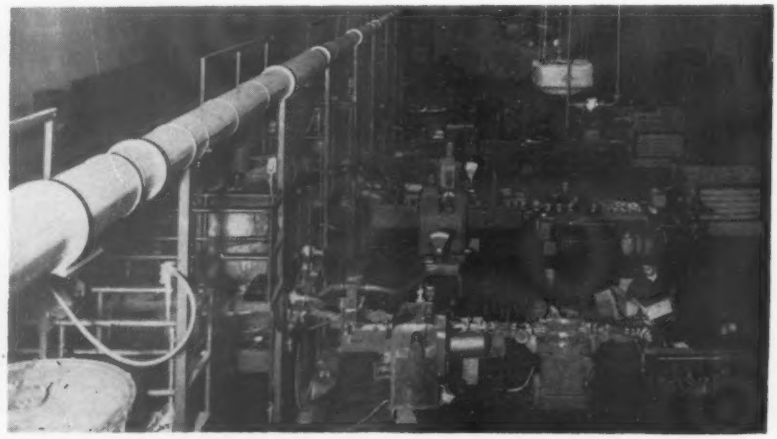
Spurred on by merchandising often by advertising on radio and television plus the distribution of pamphlets on the dynamics of color, and free advice by architects, water-based paints have become firmly established in Italy. From the beginning, the use of the acrylate-base types has been limited for economic reasons. Vinyl acetate base paints and those prepared with styrene-butadiene emulsions are better known today. In any case, the use of water-based paints is greatly increasing. The consumption of water paints may come close to the ten thousand ton a year mark, which is slightly less than a tenth of the total national output of paint products.

Nitrocellulose Enamels

There is very little new activity in this field. The principal uses of such enamels are still for auto bodies and wood. Metallic or pearled nitrocellulose enamels are more commonly employed for luxury custom body work; matt finish nitrocellulose coatings are coming into use as a finish for wood.

Special Effect Enamels

To the traditional air- and oven-drying wrinkle products, frosts and hammer finishes have been added the so-called "goffrati" or "orange peel" types. They are easy to use



Montecatini uses modern filling and packaging equipment.

and very effective in simulating surface irregularity, thus simplifying surface filling of the wood. They are very well adapted for esthetic refinishing of cast iron or sand cast aluminum alloy; these are precisely the cases where hammer finish enamels do not show good results.

Baking Enamels

With the constant rise of new industries for the production of home appliances, folding kitchen furniture, etc., the demand for baking enamels is continually rising. The 180°C. types are making way for others which dry at lower temperatures and in shorter times. A very common product is the non-yellowing types, hardened with melamine resins. In the field of body work, it should be noted that most of the Italian automobile plants are now equipped with tunnel ovens and hot-spray equipment, conditioning chambers, whereas the numerous bicycle and motorcycle plants are oriented to flow-coating for priming and electrostatic spray for enamel finishing. Thus, it has become necessary to prepare products particularly adapted to the type of application. A present tendency in autobody finishing is that of lowering the baking temperature to not more than 80°C. whereupon it becomes possible to bake-finish the car already complete with motor, pneumatic system, electric system and various accessories (but not with parts pressed from synthetic resins). Epoxy spray primers supplemented with acrylic enamel finishes, have been extensively used because of good durability properties. The need for speed in mass production since even in Italy most industrial manufacturing is done on an assembly line basis, have favored the widespread use of baked enamels. Some competition among coatings limited to particular applications such as stoves, gas ranges, gasoline pumps, panels for wall covering, curtain walls, etc., has initiated work in ceramic enamels.

Wood Finishes

With the advent of new methods of finishing, wooden furniture gains new ground every day. This has resulted in new plants equipped with the most modern machinery enabling mass production of high quality furniture. The Italian consumer attaches a great deal of importance to esthetic factors. Hence, factories specializing in the construction of kitchen furniture have sprung up in several parts of Italy. The finish used is a very slow drying synthetic enamel requiring long and careful preparation of the primer. After these plants, came others, completely equipped for the production of study, bedroom and living room furniture made of dark wood(mahogony, walnut, rosewood) or light wood (cherry, chestnut, chestnut oak, beech). These are spray-coated with nitrocellulose finishes. Nevertheless, the use of high solids coatings, and the application of multiple coats (up to eight or more) have been known in the course of time to result in a shrinkage of film thickness, causing the initial brilliance to disappear while the grain and pores of the wood show up. The adoption of polyester resin base finishes, which from the beginning has met with great success, has had the advantage of making possible, with rapid processing and savings, surfaces which are not only beautiful—both transparent and colored—but also resistant to stains, temperature and scratches. With these polyester finishes, the component parts are coated before assembly. Special spraying devices, with one or two heads, are used. This permits the spreading of a single film of catalyst and polyester at one time. Successive coats can be applied immediately. Even polishing is done by machine. Thus, furniture which at one time required several months for coating, drying and polishing is now finished in a single day.

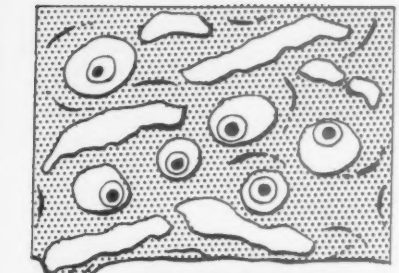
Testing laboratory is equipped with many specialized instruments for evaluating the performance of Montecatini's paints.

Certain types of paraffin-free polyester coatings, which gleam without polishing, are currently in the development phase, and are coming into use especially for interior furniture parts and for curved pieces which do not lend themselves to mechanical polishing. It is interesting to note that in Italy, polyester coatings have been used experimentally for some years for the coating of automobile bodies. Excellent appearance and resistance to weathering have been demonstrated with these coatings.

Other coatings widely used for wooden furniture are the epoxy resin base coatings, preferred on the whole, not only to the traditional flat finishes, but also to the isocyanate types which often shows pores. In addition to the above types, coatings for wood floors, for the most part, are the catalyzed melamine resin type, and these are being produced in large quantities.

Marine Paints

In this field there is an increasing use of anti-corrosive and anti-fouling vinyl base coatings. Application of these products requires the sandblasting of plate steel, and several Italian shipyards are already equipped with dry or wet sandblasting units. Southern seas, particularly the Mediterranean, fa-



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vor formation of incrustations on ship bottoms, so that Italian manufacturers of underwater coatings have had to study the problem to the point where they are notably advanced in the development of this kind of paint.

Regarding tankers, it should be pointed out that Italian shipyards are consuming a considerable amount of epoxy base paints for the internal protection of tanks used for the transportation of various liquids. Tanks have been known to carry fuels and mineral oils on one trip, and then after washing with butterwort, return to Europe carrying wine. The use of epoxy paints which are unaffected by solvents or seawater and do not impart any odor or flavor, offers shipowners the possibility of round-trip utilization of their tankers.

Acid-Resistant Paints

The growth of the chemical industry in Italy, with the continuous rise of new mineral oil refineries and organic synthetics plants, has been such that the atmosphere of whole areas especially near the coast has become contaminated with fumes. The need for acid-resistant and anti-corrosive paints have instigated first a study, and then the manufacture of paints for the effective protection of plants, structures, pilings, electric lines, and other metal objects located in these areas.

Bituminous base products, which at one time was used to coat supports, struts, trusses, towers and reservoirs (iron or concrete) exposed to industrial atmospheres, have already disappeared. In their place chlorinated rubber paints, vinyl base paints, cyclized rubber base paints, epoxy resin or silicones (for chimneys or parts subjected to high temperature) are currently coming into use, depending on conditions of use, extent of corrosion, temperature and mechanical stress and strain.

Special Coatings

Developments in packaging has been such that even in Italy, interest in the last few years had been directed toward special coatings which give good adhesion and good appearance when applied to containers of pressed resins, cellophane, polyethylene, polyvinyl and similar materials.

Electro-Insulating Coatings

Outside of the traditional oleoresinous base types, this is a field in which Italy has necessarily remained behind. In the enamelling of wire, advances have been made, but the absolute lack of necessary raw materials for the manufacture of more modern products, such as terephthalic and silicone coatings, have discouraged the interest of paint manufacturers.

Standardization of Coatings

The growth of the Italian paint industry, which only 30 years ago was completely in the hands of a few craftsmen, has posed many problems involving standardization. Italian manufacturers, convinced not only of the necessity, but also of the utility of standardization in the field of coatings, have cooperated in organizing in UNICHIM (affiliated with the Italian Association for Standardization) a special subcommittee dealing with "Paints, Coatings and Enamels." Technicians from the more important industries, as well as those of public and state associations—railroad, marine and aeronautic—meet periodically in Milan to discuss standardization problems of interest to industry as a whole. One outcome of this collaboration was the "standardization, Definition and Determination of the Properties of Paint Products", published three years ago. It is now in its second edition, and has been officially adopted by all the companies in the associations concerned. The necessity of appropriate terminology to express definitions clearly and to deal with anything concerning the manufacture and use of coatings (materials, products, quality, operations) has led the Subcommittee to compile a "Glossary of Paints and Coatings," which has recently been distributed to interested firms throughout the nation. The work of standardization has successively turned to the specification for the certification of single products, raw materials, and so on, always bearing in mind the special requirements of Italian production, as well as the standards already accepted in other countries.

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OUTLOOK for WEST GERMAN PAINT INDUSTRY

Dr. Han Friedrich Sarx, director of the German paint firm Herbig-Hahrhaus AG in Cologne discusses the future of the German Paint industry and the immediate problems it faces.

HOW is the paint industry in West Germany faring today? My answer to this question is: "it is doing very well, but there are certain problems."

Keen Competition

It is a well known fact that profits in the paint industry are small and only by working at full capacity can the German paint manufacturer realize a satisfactory return. In the economic boom which West Germany is currently experiencing, construction activity is at a high level. Consequently, there has been a big demand for all kinds of paint products, which the users specify must be of high quality and sold at a very competitive price. To meet this competition and maintain their position, paint manufacturers find it necessary to constantly modernize their paint making equipment and improve the overall efficiency of their plants

World War II destroyed many paint and lacquer manufacturing plants. Rebuilding of a number of these plants has been accomplished very quickly, much to everyone's amazement. Coupled with this rebuilding has been the modernization of all manufacturing operations.

It is interesting to compare the paint industry of our respective countries. I have been in the United States several times, visiting almost all of the leading American paint factories. We were able to establish very pleasant relations with the American manufacturers and I am pleased to emphasize that our American colleagues came to

Dr. Hans F. Sarx

visit us in Germany to exchange ideas and experiences. This exchange of views continues by mail to our mutual advantage. Here, I would like to thank the many American manufacturers for the very pleasant reception they have accorded to me when visiting the United States.

Mechanized Operation

I believe that the methods of production and the mechanical equipment of the American and German Paint Industry, basically do not differ to any great extent. However, the American paint industry maintains a superior position, due to its complete automation of the filling and packaging operations as well as the entire transfer lines in the plants. Our American friends can easily take advantage of the latest technical developments because their production rates are high. The individual orders are larger and the much smaller line of products lend themselves to automated processing.

In Europe we have to deal with many small orders and have to supply a much greater variety of products. This makes it very difficult to streamline our operations although it would be neither a technical nor a mechanical problem to do so. The American way of packaging by volume represents a very important advantage.

The comparison of the technical equipment leads to the appraisal of the American and German factories competing in the European markets. The American industry

is at a decided advantage in view of the higher level of mechanization. Also, prices are much more favorable, although the American manufacturer has to pay much higher wages. On the other hand, the German paint and lacquer industry is accustomed to render a very individual service to its customers and manufactures by supplying mostly "tailor-made" products.

This kind of cooperation results because of the very close relations between supplier and customer.

Exchange of Ideas

Immediately after the war there were almost no contacts between the American and the European Paint Raw Material Manufacturers. Fortunately enough, this has been replaced by very close cooperation. We have taken advantage of a number of very interesting developments in the United States, primarily synthetic resins such as vinyls, the plastisols, plasticizers, the epoxies, and a number of finishing methods such as the electrostatic spraying or flow coating to name just a few. On the other hand, I assume that some of the German or European developments, such as polyvinyl ester dispersions, the DD materials and the unsaturated polyesters, the casting machines needed to process the afore-mentioned, and other chemicals, were interesting to our American friends.

We endeavour as well as the Americans to adapt and introduce new synthetic materials as quickly as possible in manufacturing.

Striking a balance sheet, I can forecast our great confidence in future developments, assuming that no political complications will delay our progress. We hope and desire that normal trade relations will be established again with East Germany and Iron Curtain countries.

We welcome the formation of the European common market although we are not quite sure about the implications its future will bring. However, we believe to be strong enough to maintain our position and we hope to improve it. We know very well that we will have to work very diligently because paint firms of other European common market countries, will offer keen competition as they have demonstrated considerable technical progress over the last few years.

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Better Things for Better Living . . . *through Chemistry*

By
Phil Heiberger

The author continues his random reflections on various aspects of the paint industry. The opinions expressed in this column are his alone and do not necessarily reflect those of this publication.

Work for Georges

THE late writer and vigorous thinker, Henry L. Mencken, famed for his barbed wit and satirical humor, was known to remark frequently to friends, "(Thomas) Carlyle was right. The only solution is work." Mencken was right, too. Experience shows that when work is shirked, for whatever reason, usually the devil takes the hin'most.

P. Heiberger

Unfortunately, people have a tendency to allow themselves to be deluded, now and again, into thinking that work, in certain instances, is not at all necessary, or, if admitting it *is* necessary, to adopt the popular attitude first expressed over 400 years ago by Louis XII of France, when he said, referring to his competent prime minister, Cardinal Georges d'Amboise, "Let Georges do it." The sad fact is, there just aren't enough Georges around these days.

Alkyds

In the case of alkyds, it has too commonly been held that their manufacture is a simple fool-proof operation. You have merely to "cook" them by charging a kettle with a few appropriate raw materials and then heating the "mess" to be specified viscosity and acid number. When the batch deviates from the specifications (which it often does), the situation is routinely rectified by one of several simple operations.

The ease with which deviations could be corrected led to the delusion that it was not necessary to study the mechanism of alkyd formation seriously. The prevailing excuse was that it did not matter *why* the deviations occurred nor did it matter at all *that* they occurred. The only important consideration seemed to be that their correction was not a complicated affair and the end product was a uniform, usable product.

Now comes an article, to be summarized below, published in the June 1959 issue of the *Journal of the Oil and Colour Chemists' Association*, "The Relation between Degree of gree of Esterification and the Properties of Alkyd Resins," by D. W. Berryman, which discredits this popular delusion. Berryman, incidentally, is one of the few "Georges" who "did it." A search of the literature would reveal a pitifully small number of serious attempts to relate alkyd process factors such as reaction rates, reaction temperatures, or known side reactions with practical paint properties such as pigment wetting, drying character, gloss retention, blistering, haze resistance, package stability, etc. As a rule, alkyd properties are correlated crudely with oil length, acid number, viscosity or specific starting materials.

The reason for this is aptly stated by Berryman, "As alkyd resins were first introduced before the chemistry of polymeric products was clearly defined, their systematic formulation and application was retarded by attempts to adapt them to the terminology and needs of the makers of oleoresinous varnishes. This attitude is still apparent in certain compartively recent textbooks which still relate such properties as drying rate to the 'oil length' of the resin without regard to its basic polymeric structure."

The following quotation has been taken directly from the published abstract which preceded Berryman's article. "A revised concept of alkyd resin formation is developed from a study of reaction kinetics and its application to the formulation of surface coating vehicles is demonstrated. It is based on the principle that polymer properties change in a predictable manner with the progressive condensation of mixed polyol half esters, the nature of which can be defined by an expression for the average functionality of the mixture prior to reactions involving the loss of reaction water."

Alkyd Fractions

Before coming to the meat of Berryman's article, a quick rereading of R. Burkel's article in the August issue of this magazine may be advisable to bring freshly to mind another point of view of what alkyds are and what state of development alkyd technology may be in.

Burkel states, "Unfortunately, alkyds turn out to be one of the most complicated and least known type of polyesters. The theory of functionality. . .was a major contribution to the understanding of polyester chemistry. When ap-

plied to alkyd chemistry, this theory serves only as a rough guide. Alkyd chemistry is not yet an exact science. The old method of trial and error still prevails."

Burkel also states, "Solvency and extraction studies show that alkyds are a mixture of a widely different types and quantities of molecular species. The curve of the molecular weight distribution of a given alkyd is far from an even bell shape. In general the solubility sequence goes as follows: The high molecular fraction is soluble in the medium molecular fraction, this group is in turn soluble in the small molecular fraction and then in the solvent. If any of these fractions are removed from the alkyd, the solubility pattern breaks down, part of the alkyd goes out of solution.

"It was found that the very high molecular fraction has very poor solubility, very low acid number, poor grinding characteristics. On the other hand, the very low molecular fraction has high acid number, very poor drying characteristics and no durability to speak of."

In other words, the implication is that intermediate fractions of alkyds are most desirable. Knowingly or unknowlingly, we strive to approach the optimum range. If more basic knowledge were available, we might learn either to direct the reaction toward the optimum size or we might follow the petroleum industry practice and learn to segregate the desired fractions.

Processes Influence Properties

Berryman's article will be of most value to the resin chemist, but paint chemists and resin users may also find important implications. For example, Berryman found that film hardness and air drying potential reach a maximum as polymer size reaches the gel point. "Two years of exterior exposure with pigmented films have shown that resins which approach a linear structure have the best resistance to weathering. High reaction temperatures are associated with premature gloss drop and failure by blistering. Checking decreases with increasing polymer size. The nature of the fatty acid will naturally influence the degree of yellowing of films, but there is a noticeably greater yellowing with high temperature than low temperature resins. . . . . From those results we conclude that air-drying alkyds should be prepared as close to gelation as is consistent with can stability when maximum air drying rates and good durability are required. Reaction temperatures and rates and fatty acid content are also critical in achieving the best drying rates."

". . . in alkyd—nitrogen resins systems the alkyd component must be considered as a polymeric plasticizer in formulating satisfactory vehicles. An upper and lower limit to polymer size is necessary to have good plasticizer action. For this to be fully effective, there must be available sufficient hydroxyl groups to ensure compatibility with the nitrogen resins and a related number of carboxyl groups to ensure adequate copolymerization of the two types of vehicles during the curing cycle. The quantities of each required show important changes with the types of fatty acid present."

New Constants

Although much is unknown about alkyd structure, it would certainly be an exaggeration to say that nothing is understood. Of course, there is a limited body of knowledge. It is not always used to the fullest extent, however, and this constitutes a large drawback. Clearly, if the general alkyd technology were advanced, it would probably make specific alkyds more capable of meeting the challenge of the newer materials reaching the markets.

The paint formulator could benefit in many ways from knowledge of the molecular weight distribution, hydroxyl content, degree of unsaturation, specific intermediates, reaction temperatures, structure, etc. of each alkyd in common use. This statement requires qualification. Actually, such information, assuming it were available, would be premature and of little value unless the additional data were carefully correlated with paint performance. The mere listing of additional constants without appropriate correlation would only confuse the issue.

Unfortunately, to attain this knowledge would cost money. Thus, it would become necessary to equate the need for the data with the costs involved. One must determine how much lower rejects, longer film life, less customer complaints regarding gloss loss, hazing, blistering, etc. are worth in terms of increased resin costs. Equally important is whether such fundamental studies may lead to new techniques, e.g., fractionation, which may be forerunners of new "know-how."

Onward March of Progress

Both producers and users of alkyds may find the alkyd situation of intense interest. It is true that history repeats itself. Alkyds replaced oleoresinous varnishes a few years back; now newer vehicles threaten to undermine the alkyd position.

It boils down to this: If the newcomers are outstandingly superior, alkyds deserve to be ousted. If, however, the newecomrs are better only because the best has not been brought out in alkyds, then abdication is not the wise choice and a fight for the survival of alkyds is justified.

But where are the Georges?

•

Celanese Compietes Expansion

Completion of a multi-million dollar expansion of Celanese Corp. of America's acetic acid facility at Pampa, Texas, has nearly doubled its capacity, making it the largest acetic acid plant in the country, the company announced today. The plant's capacity is 240 million pounds a year for the two basic acetyl chemicals, acetic acid and acetaldehyde.

Richard W. KixMiller, President of Celanese Chemical Co., described the expansion as a step in a long-range plan to diversify, upgrade and expand production of Celanese chemical products. The company, he reported, currently is hard pressed to fill demands of customers for acetic acid and its derivatives.

Acetic acid, a basic chemical used by American industry, is one of the few organic chemicals in the billion pounds a year category. It is used as a raw material in the manufacture of many consumer and industrial products such as textile fibers, paints, coatings, polyurethane foamed plastics, synthetic lubricants, pharmaceuticals and insecticides. Its biggest use is in the manufacture of cellulose acetate.

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free trolley and then pushed by the chain powered trolley. The basic advantage of this design is that loads can be switched from the power unit to a gravity rail for stationary operation or temporary storage and the load does not have to be unloaded from the trolley. With the addition of electronic controls to the load trolleys, individual loads can be sent through an entire processing system without any manual switching or handling.

Trolley Type Conveyors have application in all industries, but especially in the assembly line production type of operation.

In addition to the Belt and Chain types of Power Conveyors there are Screw or Spiral Conveyors, Reciprocating or Vibrating Conveyors and Pneumatic Conveyors. These units are only suited to special applications and are not as commonplace as the other types of Power Conveyors.

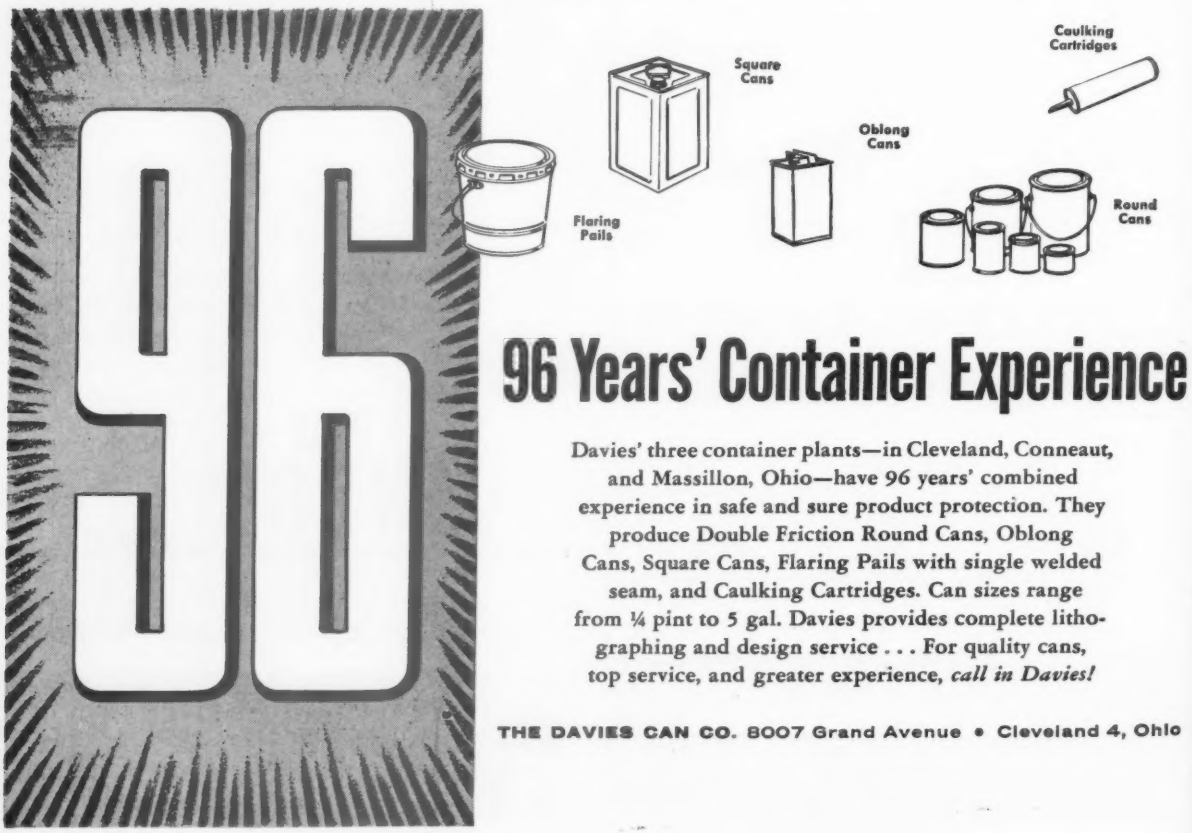
Screw Conveyors consist of coarse screws rotating in round bottomed troughs or tubes. Bulk materials are fed into one end of the screw and advanced along the length of the unit by the pitch of the screw. These units can be used in horizontal or inclined applications. Free flowing bulk type products can be handled on these units. The advantages of these units are that they can be completely enclosed to prevent loss of material and that they provide a positive material feed.

Reciprocating Conveyors are constructed similar to a flight type of conveyor except that instead of the flight moving the entire length of the bed it only moves a short distance and then returns. The product is pushed ahead on the power stroke and then the flight returns over the product on the return stroke to pick up another load. The rapid reciprocating motion will then provide a practically continuous flow of bulk material.

Oscillating Conveyors are basically flat bed conveyors that utilize a mechanical means of obtaining an oscillating movement. The amplitude and frequency of the movement cause the material to flow along the bed of the conveyor.

Pneumatic Conveyors are arrangements of sealed tubes in which a product is conveyed by air pressure or vacuum. The simplest demonstration of this type of unit is the ordinary vacuum cleaner in which dust is the product and the dust bag is the destination. The interoffice message delivery tube is an example of small carriers being handled by Pneumatic tubes.

The preceding list of conveyor types contains at best the most popular types of conveyors and some of their applications. The selection of the proper conveyor units can only be made after a thorough study of all the necessary requirements. In most cases this study is worthwhile because the proper application of a conveyor or conveyor system can provide cost reduction, increase productivity, better working conditions, reduce waste and/or improve distribution.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WAREHOUSING

(*From page 50*)

quantities of certain items. These may be brought to the shipping department direct from block storage by fork truck, or a small block storage area may be provided near the shipping department for active items which move in large quantities. This eliminates the extra handling, and the manual handling which would be required if the large volume items were fed through the order selection racks.

Packing Orders

Automatic packing of mixed items from order selection is receiving increased attention by material handling engineers, but up to this time only limited success has been attained. The greatest success has been with items which are all identical in size. When the various packages being accumulated for an order vary considerably in size, and the quantity of each is quite different from one order to the next, the lack of uniformity makes fully automatic packaging difficult to attain. In some cases where it is possible to attain, the cost is prohibitive.

Stock Allocation

In warehouse layout it is essential to think of the sales volume of every item. Fast moving, heavy volume items should be stored in a location where travel distances for movement to storage, and from storage to order selection or shipping will be minimized as much as possible. A careful study is required to determine proper allocation for each item in the warehouse if maximum economy of movement is to be obtained. A complicating factor is seasonal change in volume for the various items. What may be a good stock allocation in the summer may not be quite so efficient in the winter. This sometimes necessitates separate stock allocations for different seasons of the year.

Shipping

A common method of shipping case goods is to dead pile manually onto the floor of the car or truck. If the product is on wheeled trucks when it arrives at the shipping department, these may be pushed manually into the car or truck so that the product can be stacked into the carrier. If the product is on a pallet, it may be placed into the truck so that the product can be stacked into the carrier. If the product is on a pallet, it may be placed into the truck or car by a fork truck, a rider type low lift pallet truck, a low lift electric pallet walky, or a hand pallet walky.

Another possibility is for the fork truck which brings the pallet load to shipping to place the pallet load on top of a dolly or 4-wheel hand truck so that it can be pushed manually into the truck or car when the time comes to stack the product into the carrier.

A third possibility is to use portable conveyors to carry the product from a depalletizing point outside the truck or car. One or two men take the cases of the pallet and place them onto the conveyor. The conveyor carries the cases into the truck or car where another one or two men stack them.

The manual methods require two to four men 2½ to 4 hours to load cars, and 1½ to 3 hours to load trailer trucks. A fork truck operator is also required.

In the last seven to eight years increasing effort has been devoted to attaining palletized or unitized shipments. With palletized or unitized shipment, the truck or car may be loaded by the fork truck which brings the goods to shipping, thus eliminating the two to four manual loaders. The loading time on trucks is 15 minutes or less, and on cars one hour or less.

Trucks are easier to load with palletized or unitized loads than are rail cars. In general, the product arrives at destination with less damage in trucks. No bracing is needed in trucks, whereas it is usually needed in rail cars.

If the palletized product is being shipped to a destination which enables economical return of the pallets, regular permanent type pallets may be used. If it is impractical to return the pallets, expendable pallets may be used. In some cases unit loads can be developed which require no pallet.

Eliminating Warehousing

Many top executives consider warehousing a necessary evil. It costs money, but adds nothing to the value of the products. Yet it must be used to compensate variations between production and sales, or between receipts and usage.

Some companies, such as corrugated box and can manufactures, have eliminated a considerable portion of their warehousing by scheduling production so that the product can be sent to trucks or cars directly from the production line by conveyor or fork truck. Other companies have adopted statistical inventory control, which has enabled paring inventories to the bone without impairing service to customers or to themselves.

It pays to take a look at these possibilities. After slimming down inventories to the lowest possible point, the next step is to take a close look at storage and handling methods so as to obtain maximum economy for those inventories which are still essential.

★ ★ ★

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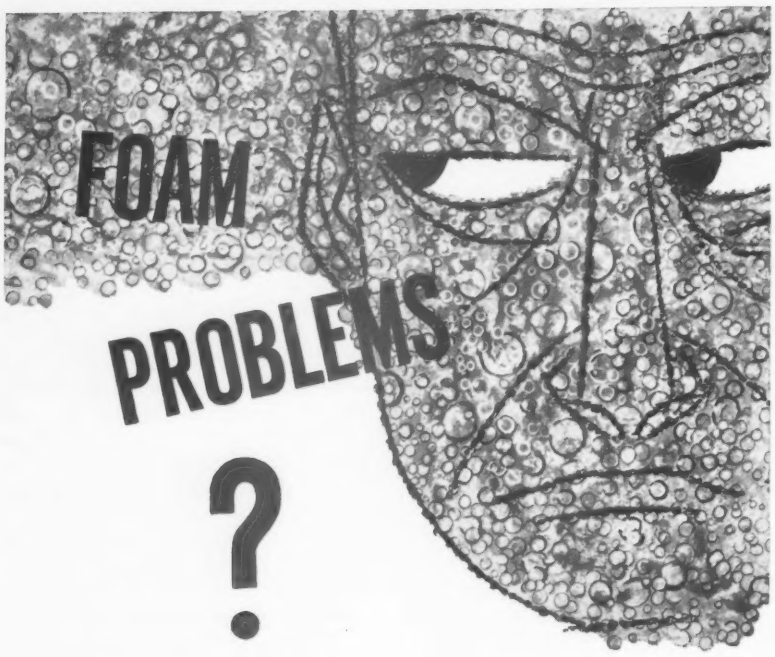

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HOISTS

(*From page 75*)

barrel grips which not only simplify load handling but remove many of the safety hazards that add to the cost of the total plant operation.

Analysis of Requirements Essential

The more the subject is pursued, the clearer it becomes that potential uses for overhead load handling equipment are as numerous as the types of equipment now available. Consequently, the importance of proper selection cannot be emphasized too strongly. Careful consideration must be given to factors like the following: a) maximum weight of loads to be lifted; b) frequency of use; c) length of lift; d) required horizontal travel and lateral traverse; e) human energy required to operate the equipment; f) efficiency of the equipment; g) headroom requirements; h) protection for personnel, load, lifting device, and plant; i) economy or cost-cutting ability of the equipment.

Only when all the essential operating requirements are satisfied by the overhead load handling equipment can you be sure that the investment will be profitable over the years. In many large plants the total investment is of such dimensions that management has created materials handling departments. Such departments are staffed by specialists acquainted with all kinds of materials handling methods and machines and to recommend both. The obvious reason for this development is the growing recognition of sound materials handling practices and proper equipment as the source of needed savings in all departments from receiving to shipping. It has been said—and with considerable truth—that materials handling offers industry today's biggest single opportunity to cut costs substantially. Only a scientific approach can assure the best possible results in keeping production on the move economically.

NPVLA and FEDERATION MEET IN ATLANTIC CITY

Javits, Cherne, Forums Feature 72nd Meeting

Highlighting the 72nd Annual Meeting of the National Paint, Varnish and Lacquer Assn. will be the Keynote address delivered by Sen. Jacob K. Javits of

Sen. Jacob K. Javits

New York. A member of several important committees in Congress, Senator Javits is a dynamic and authoritative speaker who will deliver a message of vital importance to the membership.

An important forum on *Advertising and Sales Promotion* will be held on Monday, October 19. Under the apt leadership of Henry Behnke, the forum will discuss the following subjects:

- Encroachment of substitute materials
- Selling paint instead of raw material ingredients
- "Hidden power" sales training program
- "Public relations used as a selling tool.

On Tuesday, October 20, several workshop sessions, limited to 20 participants will be held. Among the subject covered in the workshops are:

- Color merchandising
- Time payment selling
- Legal problems
- Selling chemical coatings.

Another highlight of the Convention will be the appearance of Leo Cherne as featured speaker. Enjoyed by the membership for many years, Mr. Cherne will speak on Wednesday, October 21.

Leo Cherne

Mr. Cherne will talk on "The Summit—The Dollar—The Market—The Future" and will answer questions from the floor as time will permit.

Vesce, Woodman, Panels Feature 37th Meeting

Vincent C. Vesce, Technical Director for Harmon Colors, Allied Chemical's National Aniline Div., Hawthorne, N. J., has been chosen to present the Annual Joseph J.

Vincent C. Vesce

Mattiello Memorial Lecture at the 37th Annual Meeting of the Federation of Paint and Varnish Production Clubs, to be held in Atlantic City, N. J., October 24-29.

The subject of his talk will be *Exposure Studies of Organic Pigments in Paint Systems.* It will be given at the Friday session, October 23rd, in the American Room of the Traymore Hotel.

Mr. Vesce is the eleventh scientist to give the Mattiello lecture named after the late Dr. Joseph J. Mattiello, a member of the Federation who did much to expand the application of the science in the protective coatings field.

In recent years, Mr. Vesce's work has been directed toward preparation of new light-fast pigments suitable for pastel coatings and in the preparation of special dispersions for special industries.

It is perhaps fitting that Mr. Vesce should be selected for this great honor. During World War II he collaborated with Dr. Mattiello in a study of infra-red reflectance of pigments.

Keynote Address

The Federation of Paint and Varnish Production Clubs has announced that Herbert B. Woodman, President of Interchemical Corp. will deliver the keynote address at the 37th Annual Meeting of the Federation to be held in Atlantic City, October 24-29.

He will speak at the Friday session, October 23rd, which will be held in the American Room of the Traymore Hotel.

Mr. Woodman entered the University of Wyoming with the idea of studying journalism. Late in his college career, his interests changed

Herbert B. Woodman

to law. During his second year at Harvard Law School, he was awarded a Rhodes Scholarship. He was admitted to the bar in Wyoming and later went abroad to study juris prudence at New College, Oxford. He later became associated with the New York law firm of Cravath, de Gersdorff, Swaine and Wood upon his return from England in 1930.

Assigned to work for Interchemical a few years later, he was invited to join the corporation as Secretary and Vice-President in 1936.

Fire Demonstration

Under the sponsorship of the Hercules Powder Co., a lecture and demonstration, *The Magic of Fire*, will be given Friday, October 23, at the 37th Annual Meeting of the Federation of Paint and Varnish Production Clubs in Atlantic City, N. J.

The presentation is part of nearly 30 hours of demonstrated lectures developed at Dallas, Tex., by engineers of the Health and Safety District G of the Bureau of Mines. "What is fire? and What causes

Charles L. Jones

explosions?" are asked and then answered in words and actual demonstrations. Although the demonstration is considered spectacular, it is not intended to create fear. It was designed to show how to use and handle flammable or explosive materials to be sure that one isn't burned or blown to bits as a result of handling these materials.

Among those responsible for the demonstration is Charles L. Jones, who is responsible for safety in all plants of the Hercules Powder Co. Mr. Jones is a safety advisor to the protective coatings industry and author of two books, *Safety in Lacquer Plants* and *Lacquer Plant Design*. Hugh D. Graham and Edward J. Podgorski of the U. S. Bureau of Mines will put on the demonstration and give the lecture.

A talk by E. W. Boulger on "Studies Involving the use of Various Fatty Acids in the High Polymer Technique for Alkyd Cook-

Mark W. Westgate

Cooking" will be presented on Thursday, October 22.

Fire Retardant Division

Also on Thursday, October 22, a panel discussion, "Fire Retardant Paints" will be presented. Moderating the panel will be M. W. Westgate, of Gardner Laboratory, Inc.

Other members of the panel include:

L. J. Jacdon, Atlantic City Fire Prevention Bureau;

N. B. Garlock, National Paint, Varnish and Lacquer Association;

L. W. Shugar, Baltimore Paint and Chemical Corporation;

A. W. Van Heuckeroth, U. S. A. Engineering Research Development Laboratories.

Naftone to Present Color Talking Movie On Roskydol Polyesters

Naftone, Inc., 425 Park Ave., New York City, will present a color talking movie on the subject of Roskydal polyesters. The movie, which will take about 30 minutes, will be shown in the Submarine Room of the Hotel Traymore at 2 p.m. on Friday, October 23.

The movie shows the mechanism of the polyester reaction, the operation of this resin in a curtain coating machine and the complete workings of a modern, efficient German furniture factory. This factory uses many semi-automatic sanding and buffing machines. It also shows an artists' diagram of the polyester reaction and the curtain coating operation.

NEWS

NEWS OF COMPANIES, ASSOCIATIONS
TECHNICAL GROUPS
ITEMS OF GENERAL INTEREST

Steel Container Plant To Service Northeast

Gordon D. Zuck Leonard Paynor

Formation of a new manufacturing firm, Atlantic-Vulcan Steel Containers, Inc., a steel pail manufacturing company, was announced today by the company's President, Gordon D. Zuck.

The new company is an independent Massachusetts corporation with headquarters offices and plant in Boston. The company will make a complete line of steel pails for the paint, chemical, petroleum, printing ink, and food products industries in the busy industrial northeast. Sizes ranging from 1½ gallon through 7 gallon will be featured. All standard gauges and styles, hi-bake lined and lithographed, will be made at this new plant as well as a line of specialty tin cans for the ink trade.

A new building is under construction at this time, and new machinery is available to begin production at an early date, which will be announced in about thirty days, according to Mr. Zuck.

Mr. Zuck, a veteran of 28 years in the steel shipping container business, is also President of Vulcan Steel Container Co. of Birmingham, Alabama and Southwestern Steel Container Co., Dallas, Tex.

Leonard Paynor, Vice President and Manager, is a long time resident of Boston and is widely known throughout the noretheast. Mr. Paynor has been a sales representative for Vulcan Containers, Inc., of Bellwood, Ill. for the past year, and prior to that was in the purchasing field.

Other officers of the Company are Vern I. McCarthy, Jr., Vice President, Raymond Ellis, Clerk, and Paul Oberholtzer, Treasurer.

Rheology Conference to Feature Talk by Reiner

Dr. Markus Reiner, director of the rheological laboratory at the Israel Institute of Technology, will be one of the featured speakers at the 30th anniversary conference of the Society of Rheology to be held Nov. 4-6 at Lehigh University.

The three-day sessions will be devoted to a discussion of the mechanical behavior of structure of matter. Technical reports on the measurement of the deformation and flow of matter and the interpretation of the physical data in functional terms will be presented during the meetings.

One of the features of the conference will be an adhesion symposium. The speakers and their subjects at this will be:

Franklin Chang, Mystik Adhesive Products, Inc., *Peeling Force of Adhesives.*

John E. Rutzler, Case Institute of Technology, *Chemical Bonds in Adhesion.*

David H. Kaelble, Minnesota Mining & Manufacturing Co., *Theory and Analysis of Peel Adhesion Bond Stresses and Distribution.*

Yonosuke Kobatake, Tokyo Institute of Technology, *Mechanism of Peeling.*

James T. Bergen, Research Physicists, Group Leader, Armstrong Cork Co., Lancaster, is program chairman for the year's conference.

Other members of the planning committee include Dr. John H. Elliott, Research Center, Hercules Powder Company; Dr. Rodney D. Andres, Massachusetts Institute of Technology; and Dr. W. R. Willets, Titanium Pigment Corp.

•

New Plant Site

W. Vernon Barrett, president of Southern Lacquer & Paint Corporation, South Gate, Cal., has announced the purchase of a new Southern Lacquer three acre plant site.

The new site is located in a new industrial section of South Gate between Garfield Avenue and the Long Beach Freeway, south of Firestone Boulevard. Construction of the new plant is scheduled to start January, 1960 and completion for occupancy will be midsummer, 1960.

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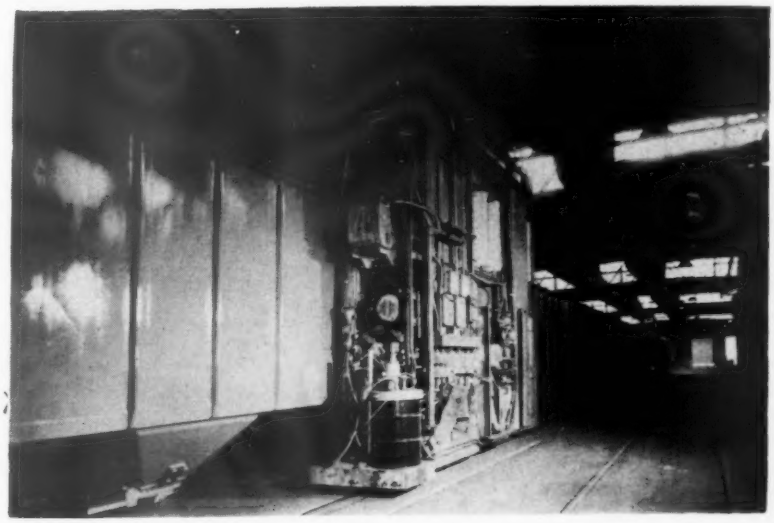
Heyden Newport Plant

Heyden Newport Chemical Corp. has announced that it plans to build a new 24 million pound per year plant for the production of maleic anhydride and fumaric acid. The plant will be located at Fords, N. J.



PROTECTIVE COATING: Automatic spray equipment applying coating on hopper cars at Pullman-Standard Manufacturing Company, Butler, Pa. Coating, based on a Bakelite vinyl resin, said to provide many years protection from weather and chemicals.

NEWS

Charles H. Dresser Retires

The retirement of Charles H. Dresser, a widely-known figure in the solvent and naphtha fields of the oil industry, has been announced by the Anderson-Prichard Oil Corp.

Dresser, Vice President of Industrial Sales for Anderson-Prichard, had been with APCO for 39 years. He was the first man employed by the company when he joined it in 1920 as a sales manager.

Charles H. Dresser

In 1946, Dresser was made vice president of industrial sales, a division which includes solvents, naphthas and asphalts. Prior to that time her served as director of industrial sales.

•

Reichhold Purchase

Reichhold Chemicals, Inc., has announced its intent to purchase the Varcum Chemical Corporation of Niagara Falls, N. Y. for an undisclosed amount of cash.

The company manufacturer a wide range of liquid, powdered and solid phenol formaldehyde resins which are used in various industries as a bonding agent for brake linings, coated abrasives and grinding wheels. Also produced by Varcum are resins for metal can coatings, paints and varnishes, insulating varnishes for all types of wound equipment and other applications.

Dyna-Therm Acquisition

Dyna-Therm Chemical Corporation has acquired all of the assets of Plas-Kem Chemical Corporation, Burbank, Calif., a major factor in the vinyl plastisol and organisol field on the West Coast.

Plas-Kem will be operated as a wholly-owned subsidiary in Burbank. Elbert Davis, former principal stockholder of Plas-Kem, will continue to direct the new division and will become vice president in charge of research and development for Dyna-Therm.

•

New Look for Skyway

The three and a half mile long General Pulaski Skyway, which connects Jersey City with Newark, New Jersey, will soon be newly coated with 30,000 gallons of paint.

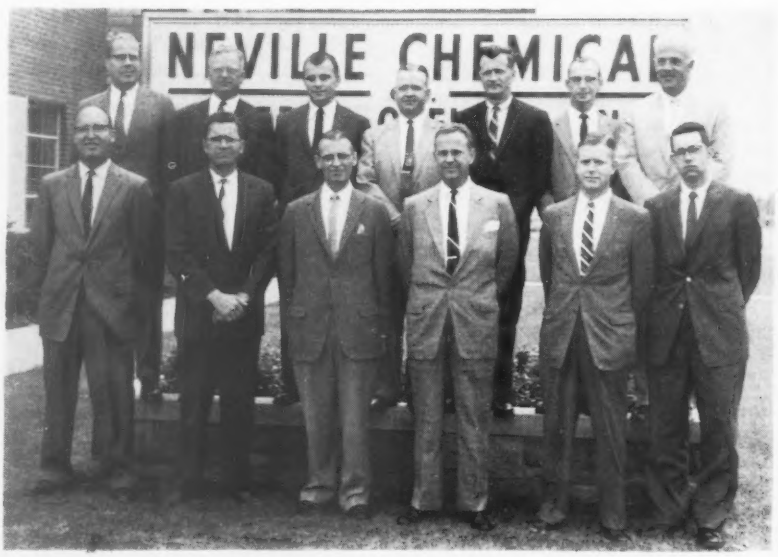
This giant artery, which pours thousands of cars into Metropolitan New York each day, is being worked on by 60 painters who will wear equipment and other applications.

The 97,500 tons of steel which comprise the bridge were last painted in 1946. Named after the Polish general who helped the cause of the American Revolution, this major traffic link to New York rises to elevations of 100 to 130 feet, stretching over land as well as the Hackensack and Passaic Rivers.

Robinson Elected President

At its last meeting, the Board of Directors of International Epoxy Corporation, Fort Lauderdale, Florida, elected Dr. Raymond E. Robinson as the company's president. Dr. Robinson previously held the position of executive vice-president. Prior to coming to Fort Lauderdale, Dr. Robinson was the founder-owner and president of one of Canada's leading plastic manufacturers—Robinson Industrial Craft of London, Ontario, Canada.

International Epoxy Corp., is a formulator of Epoxy resin products. The business located in Fort Lauderdale, Fla., has shown a tremendous growth pattern in the past year, in which international distribution has been attained. This firm has established themselves as the largest Epoxy formulators in the southeastern section of the United States. Epoxy resins are used and formulated into masonry paints, marine paints, swimming pool paints, industrial adhesives, caulking and weatherproofing compounds, as well as protective coatings—all under the brand name, *E-Bond*. International Epoxy Corp., has experienced the amazing average sales growth of approximately 28% each month for the past eight months.



NATIONAL SALES TEAM: Neville Chemical Co.'s technical sales representatives met recently at the Neville Island headquarters near Pittsburgh, Pa., for the semi-annual sales meeting. Left to right, top row, are Technical Director J. J. Freeman, W. J. Wald, William Williams, William Craig, Harvey Wheeler, Walter F. James and William Cloake. Bottom row, left to right, are Charles Beck, Donald Marsh, General Sales Manager E. Glenn Isenberg, Neville President Lee V. Dauler, John Villing and James Steen.

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PERSONNEL CHANGES

CONTINENTAL CAN

Robert E. Lambert has been appointed Pittsburgh district sales manager for the Eastern Metal Division, it has been announced. Mr. Lambert had been a metal can salesman in the Pittsburgh office since 1946.

He is replacing **Paul A. Loofbourrow** who is retiring after being in the can manufacturing industry since 1917.

CELLOFILM

Arthur M. Golden has been appointed president, it has been announced.

A. M. Golden

His company, one of the largest independent producers of nitrocellulose solutions, was originally a joint venture of Universal, Paramount and RKO. Since control of the company was transferred to its present owners, Mr. Golden has been executive vice-president.

In his new position, Mr. Golden will be the chief executive officer of the company.

DIAMOND ALKALI

The following personnel changes have been announced. They are the result of the recent death of **Walter W. Cooke,** general superintendent of the Chromium Chemicals Division plant in Painesville, O.

A. W. Waller, manager of the division's Kearny, N. J. plant, becomes operations manager of the division at both Kearny and Painesville.

George Henderson, assistant plant manager at Kearny succeeds Mr. Waller and becomes general superintendent at Kearny.

George Barbieri, special staff assistant at the company's Cleveland headquarters office, becomes general superintendent of the division's plant at Painesville.

Matthew A. Killinen, assistant superintendent at the Painesville plant will be assistant general superintendent at Painesville.

SPENCER KELLOGG

Donald D. McCready has been promoted to the position of pacific coast area technical service manager it has been announced. He has served the company as west coast technical service representative.

D. D. McCready

Mr. McCready entered the organization in Buffalo, New York in September, 1947, with his first assignment in the central control laboratory. Subsequently, he was transferred to the technical service laboratory, the special oils and technical service departments and in July, 1955, was advanced to the position of midwest technical service representative working out of the company's Chicago office. In October, 1958, he was appointed west coast technical service representative.

WESTERN PETROCHEMICAL

Professor Herman F. Mark, has been named to the board of directors, it has been announced.

H. F. Mark

Professor Mark is director of the Polymer Research Institute of the Polytechnic Institute of Brooklyn. He currently serves as consultant to Du Pont, The Poloroid Corporation, Standard Oil of Indiana, Shell Development Company, and General Motors, as well as Western Petrochemical.

He is chairman of the Timber Utilization Committee of the United Nations, and the Editor of the Journal of Polymer Science in New York.

BETTER BUILD at LOWER COST with Diamond Multifex MM®

Try this formula. It gives you epoxy enamels with better build at lower cost. Laboratory tests and accelerated weathering tests show the following:

1. Multifex MM can be added at the rate of one pound to the gallon, with an average increase in viscosity of only 8 KU. Full gloss is maintained. Better build results. Raw material costs are lowered.

2. Epoxy systems containing Multifex MM show good durability upon accelerated weathering. After 750 hours of exposure in Weatherometer and 1200 hours with salt-spray tests, there was no evidence of checking, cracking or other failure.

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PURE EPOXY (with Multifex MM added)	Pounds/100 gals.
Lampblack	2.0
Rutile Titanium Dioxide	214.0
MULTIFEX MM	100.0
Epoxy Resin (Amine)	386.0
Cellosolve Acetate	124.0
Methyl Isobutyl Ketone	126.0
(Grind 24 hours in pebble mill and add...)	
Chlorowax® 70 — 60% in Toluol	210.0
Total	1,162.0

TEST RESULTS:	With Multifex MM
Initial Gloss	Full
Gloss after 750 hours	Low
Checking	None
Rusting	None
Chalking	Yes
Blistering	None
Loosening & Removal	None
Adhesion	Good

Diamond Chemicals

GOODYEAR

The following personnel changes have been announced:

L. E. Stanton

L. E. Stanton, former district manager at Houston, has been transferred to Detroit as district manager.

Stanton received a Bachelor of Science degree in chemistry from Elmhurst College in Illinois and is a member of the American Chemical Society, Southern Rubber Group and Dallas Paint and Varnish Production Clubs.

R. W. Williams, former senior sales representative on the West Coast, has been appointed West Coast district manager. In this position, he will headquarter at Portland and also maintain offices in Los Angeles and San Francisco.

R. W. Williams

Williams joined the company's Chemical Division in 1953 as a special representative and was transferred to the Portland office soon after. He attended Reed College in Portland and was a chemical engineer in the lumber industry in Washington.

J. Platner, former senior sales engineer in the Rubber and Rubber Chemicals department, has been appointed district manager at Houston.

J. Platner

Platner joined the firm in 1947, was assigned to the Research Division in 1948 and the Chemical Division in 1953. He was senior sales engineer in the Coatings department until being transferred to Rubber and Rubber Chemicals department early this year.

He graduated from Heidelberg College with a bachelor of science degree in chemistry and received a master's degree from University of Akron. He is a member of the American Chemical Society and Akron Rubber Group.

J. D. Hunter, former senior sales representative in the division's Chicago office, has been transferred to the St. Louis office as district manager. He replaces W. E. Kelly who recently was named manager of the division's new adhesives department.

J. D. Hunter

Hunter has been with the company since 1953. Experienced in the fields of research and development, he was assigned to the Chicago district.

He was graduated from Notre Dame University with a bachelor of science degree in chemistry and is a member of the American Chemical Society, Chicago Rubber Group and the Paint and Varnish Production Club of Chicago.

HOMMEL

Leonard N. Wolf has joined the sales staff, it has been announced.

Mr. Wolf will be primarily concerned with sales of aluminum pigments, alcohols, chemicals, oils, and specialties.

He graduated from Duquesne University in 1955 with a Bachelor of Science Degree.

EASTMAN

Dr. Ben P. Rouse, Jr., has been appointed chief chemist, tenite development department, it has been announced.

Dr. Rouse, a member of the American Chemical Society, Society of Plastics Engineers and Sigma Psi, holds B.S., M.S., and Ph.D. degrees in chemistry awarded by Virginia Polytechnic Institute. Dr. Rouse served in the United States Naval Reserve in World War II.

L. A. Babbitt has been named manager, economic and market analysis, it has also been announced.

In his new position, Mr. Babbitt will expand economic and market survey studies, which he has done for the past several years.

This guaranteed paint deodorant has *proved* its complete effectiveness in thousands of gallons of paint, varnish, enamel, lacquer thinners and other similar types of products.

- **Maskit #2 makes your paint *preferred* by painters, home owners, industry and institutional men.**
- **It masks the odor in the can while paint is being applied — during — and after — the drying period.**
- **It does not affect drying time or color durability.**

Amazingly economical, 1 lb. of Maskit #2 deodorizes 150 gallons of paint. Why not order a trial pound today and make your own tests! $1.50 lb.

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CIBA

M. M. Gruber, formerly head of coatings resins sales will become sales manager it has been announced.

M. M. Gruber

Elliott N. Dorman, formerly head of structural resins sales, will become technical sales manager it has also been announced.

Richard H. Malamphy joins the company as manager of new products. Mr. Malamphy has a broad background of experience in the plastics and chemical industry, having served as sales manager for Swedlow (Plastics) Inc., of Los Angeles and Naugatuck Chemical Div., U. S. Rubber Co.

UNION CARBIDE

The following personnel have been appointed to the development department:

Guy Bartlett received a Bachelor of Science degree in chemical engineering from Clarkson College of Technology this year.

E. Mark Glannon graduated from Rensselaer Polytechnic Institute with a Bachelor of Science degree in chemical engineering in 1959.

Robert R. Krulisch received a Bachelor of Science degree from Bucknell University in 1957 and a Master of Science degree from Purdue University in 1959; both degrees in chemical engineering.

Robert Neumayer was awarded a Bachelor of Science degree in chemical engineering from Iowa State College in 1959.

Dr. Rene Roberts received a Bachelor of Science degree in chemistry from the University of Louvain, Belgium in 1953 and a Ph.D. degree in organic chemistry from McGill University in 1959.

MARBON

The following personnel changes have been announced:

J. S. Saviello

John S. Saviello has been appointed as technical sales representative for the eastern seaboard area. Mr. Saviello and **R. E. Smith** will work together in the area, with Mr. Saviello concentrating his effort on northern New Jersey and New York City. Prior to joining his present company, Mr. Saviello was associated with the Cleveland office of U. S. Industrial Chemicals as a sales representative for plastic raw materials for molders and extruders. Previously he was associated with DuPont in research, production and technical sales, and with Automatic Button Co. in supervisory capacities.

J. R. Corbin has been named sales service manager. Prior to joining his present company, Mr. Corbin worked in technical service and sales capacities with Firestone Plastics Co., and as production engineer with Tungsten & Chemical Division, Sylvania Electric Co.

J. R. Corbin

J. H. LaFollette has recently joined the chemical division, as sales-service engineer. Formerly, Mr. LaFollette was affiliated with U. S. Rubber Co., Fort Wayne, Ind., as Manager, Sales Production Coordination for the Mechanical Goods Div.

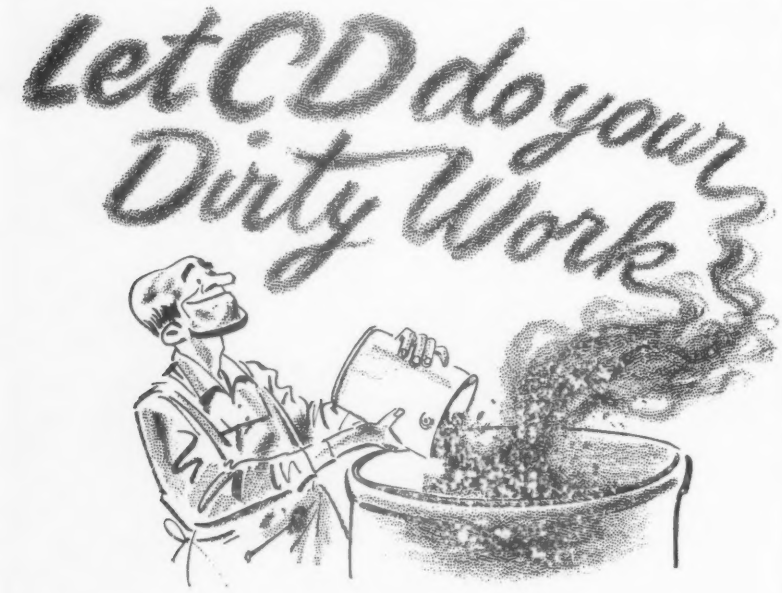
HEYDEN NEWPORT

David X. Klein has been appointed technical director, it has been announced.

Mr. Klein, formerly manager of research at the company's Garfield, N. J. laboratories, will be responsible for the division's expansion and new products program.

Mr. Klein has amassed almost 30 years experience in research chemistry, beginning with the organic chemicals division of E. I. DuPont de Nemours in 1930. During World War II, he engaged in research activity on the "Manhattan Project."

He is a graduate of the University of Chicago.



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COLUMBIAN CARBON

Lloyd D. Treleaven has been appointed manager of the rubber technical service for southern states it has been announced. Mr. Treleaven joined the the technical staff in 1953 following eight years of experience in the rubber manufacturing industry. He is a graduate of Ohio State with a B. S. in Chemical Engineering and is a member of the American Chemical Society.

L. D. Treleaven

Alden H. Davis has been named manager of the rubber technical service's eastern area it has also been announced. Mr. Davis had 17 years of experience as a rubber research chemist prior to joining the firm in 1953. He was graduated from Union College with a B. A. in Chemistry and is also a member of the American Chemical Society.

A. H. Davis

PATTERSON FOUNDRY

A. T. Jacobson has been appointed sales manager, it has been announced. Mr. Jacobson has been associated with equipment manufacturers for the process industries for many years. Joining the company in 1948, he was appointed district manager of the Detroit office, a position he has held until his present appointment. Prior to this time he was associated with Allis-Chalmers Mfg. Co.

A. T. Jacobson

He graduated from Bliss Technical School and from the University of Maryland and holds an LL. B. degree. He also attended John Hopkins University.

D. H. LITTER

Saul Spindel has been appointed senior chemist and **Thomas J. Holland** has been named junior chemist, it has been announced.

Mr. Spindel will supervise a new unit of the company specializing in the evaluation of raw materials in, and the formulation of all types of industrial product finishes of both the solvent and water thinned varities. He had 10 years of formulating experience at the Cloverleaf Paint & Varnish Co.

Mr. Holland, a graduate of St. Francis College will assist the chief chemist in technical service work.

AMERICAN MINERAL SPIRITS

Allen B. Herer has been appointed assistant eastern sales manager, it has been announced. As assistant eastern sales manager, he will be responsible for chemical sales and less than carload sales for this national marketer of petroleum solvents and related chemicals. He will make his headquarters in Murray Hill, N. J.

Formerly, Mr. Herer had been manager of American Mineral Spirits Company's Mid-Atlantic Division with headquarters at the company's terminal at Conshohocken, Pennsylvania. He joined his present firm as a technician at the company's Carteret, New Jersey laboratory. Following U. S. Army Service in Europe during World War II, Al Herer returned to Carteret and a year later became a sales representative for the Metropolitan Division in the New Jersey area. Later he was transferred to Philadelphia, eventually becoming manager of the Mid-Atlantic Division of American Mineral Spirits Company.

VICKERS PETROLEUM

Morris Preidikman has been appointed assistant process engineer of the technical division, it has been announced.

Mr. Preidikman's major responsibilities will include both plant modernization and expansion at the firm's Potwin, Kansas refinery.

Mr. Preidikman was formerly engaged in pilot plant development work for the Gordon Lacey Chemical Product Co.

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INLAND STEEL

Ralph G. Mehler has been elected vice president in charge of operations, it has been announced. Mr. Mehler has been with the firm since 1930 and for the last year has been superintendent of the company's two hot strip mills at its Indiana Harbor, Indiana, works.

CARGILL

Thomas C. Veblen, vegetable oil merchant in the Fort Dodge, Ia., office, has been named account manager in charge of merchandising activities at the firm's soon-to-be-completed Norfolk, Va., soybean processing plant, it has been announced.

Mr. Veblen will control and coordinate soybean purchases for the plant, working through the company's present buying organization, and will supervise area sales of meal to feed manufacturers and livestock producers.

Mr. Veblen joined the firm in 1955 as a trainee, transferring from Minneapolis to Fort Dodge in 1956. He was graduated from California State Polytechnic with a degree in business administration and field crops, and from Oregon State college with a masters degree in farm crops. He also took undergraduate work at the University of California.

PECORA

Eugene R. DeMers has been appointed manager of the warehousing facility in Garland, Texas, it has been announced. The new plant will service the southwest which includes Texas, Oklahoma, Louisiana, Arkansas, Kansas, New Mexico, Colorado and Arizona.

GENERAL ANILINE

Robert E. Brouillard has been appointed sales manager—pigments, it has been announced.

R. E. Brouillard

Dr. Brouillard graduated from Bates College, Maine in 1938 and received his Ph.D. from Clark University in Massachusetts in 1941. After several years with American Cyanamid Co., he joined GAF in December 1948 at the Linden plant and moved to New York as assistant manager of the pigment sales department in February 1957. In January 1958 he was named product manager—pigments.

H. Alison Webb has been appointed sales manager—dyestuffs, it has also been announced.

H. A. Webb

Mr. Webb joined the company in 1935 after graduating from Clemson College in South Carolina. After serving in both technical and sales capacities in the Charlotte office for many years, he was appointed manager of the Chattanooga office when it was opened in January 1954. He came to New York as assistant sales manager, dyestuffs and pigments, in October 1957.

SHAWINIGAN RESINS

Charles A. Godsell has been appointed to the newly created post of eastern regional manager, it has been announced.

In this new capacity, Mr. Godsell, who has been New England district manager, will be headquartered in the company's New York office and will coordinate the activities of the New England, New York and Southern district sales offices.

Mr. Godsell joined the sales department in 1955 and in 1956 was appointed New England district manager.

He received a B. S. degree in chemistry in 1942 from Hamilton College, New York.

AMERICAN CYANAMID

Charles H. Groezinger, Jr. has been appointed assistant to the manager of the process chemicals department, it has been announced.

Mr. Groezinger joined the firm in 1950 as a technical sales and service representative in the Industrial Chemicals Division and has since held a variety of posts with the division's refinery chemicals department.

In his new post, Mr. Groezinger will maintain his office at company headquarters in New York.

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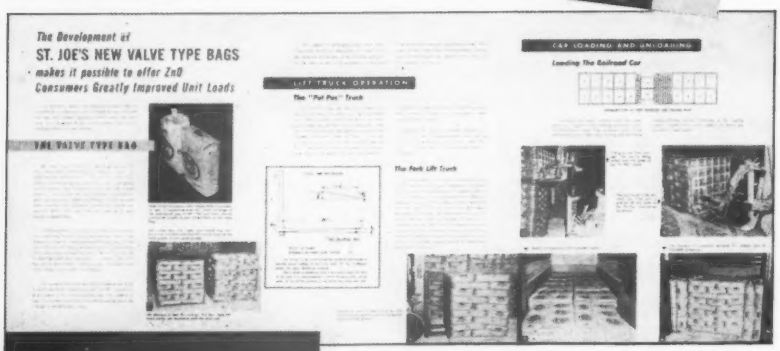
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PITTSBURGH PLATE GLASS

Guy J. Berghoff has been appointed vice president in charge of the paint division.

G. J. Berghoff

In his new position, Mr. Berghoff will be in charge of all operations of the paint division including 13 paint and plastic plants, three brush plants and one of the most modern research and development centers in the industry.

A native of Fort Wayne, Ind., Mr. Berghoff joined the company's glass advertising department in 1934. He was named director of public relations in 1944 and his responsibilities were enlarged three years later to include direction of all of the company's advertising.

He was appointed assistant to the vice president of the merchandising division in 1954 and during the last three years has served as general manager of paint sales for the merchandising division.

ARCO

David M. Gans has been named vice president in charge of research, it has been announced.

D. M. Gans

Dr. Gans has been associated with the company since 1949 as director of research for the Arco Laboratories. Prior to joining the company, among other activities he was associated with the Manhatten Project and other war work and also taught chemistry for seven years at the University of Chicago.

A graduate of the University of Chicago with the degrees of B.S., M.S. and Ph.D., Dr. Gans is a member of the American Chemical Society, American Institute of Chemists (past president of the Ohio chapter), American Physical Society, American Society for Metals, American Association Textile Chemists and Colorists, Cleveland Association of Research Directors (past president) and the Cleveland Paint Varnish and Lacquer Production Club.

SHELL CHEMICAL

The following personnel changes have been announced in the Union, N. J., technical service laboratory:

Appointed under **F. S. Swackhamer,** laboratory director, as managers are **R. F. Buller,** industrial chemicals; **C. M. Reider,** plastics and resins; and **E. S. Loeffler,** agricultural chemicals.

E. F. Eckman, formerly office manager of the laboratory, was named manager of administrative services.

DOW CHEMICAL

Fred K. Quigley, Jr., has been advanced to the position of staff manager of coating materials, it has been announced.

Mr. Quigley has been assistant manager of coatings technical service since 1956. He succeeds **E. K. Stilbert,** recently named a product group vice president of Dow Chemical International Limited S. A.

In his new post, Mr. Quigley will be responsible for long range planning and coordination of research, development, production and marketing in connection with the firm's expanding interests in the coatings field.

Joining the company in 1946 as an engineer in the organic research laboratory, Mr. Quigley transferred to CTS later that year.

He received a B. S. degree in chemical engineering from Michigan State University in 1942.

CROWN CORK & SEAL

William D. Wallace and **Lowell H. Smith** have been elected vice presidents, it has been announced.

Mr. Wallace, prior to his election, was director of manufacturing. Now, as vice president and director of operations, Mr. Wallace will head all manufacturing, industrial relations, and engineering activities.

Mr. Smith, as vice president, will continue as general manager of the machinery division, a post he has held for the past several years.

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More and more, leading latex paint manufacturers are learning the advantages assured through the complete line of surfactants manufactured by Nopco. The products in our famous Hyonic PE Series are octyl phenol condensates, and the differences in their ethylene oxide molarity give them diverse properties, suit them to a great many uses. You will find it to your advantage to become a Nopco customer. Learn how you can benefit through the use of Nopco Hyonics. Write for your copy of the booklet fully describing Nopco's *complete line* of surface active agents for the paint industry.

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EMERY INDUSTRIES

George R. Williams has been appointed to the development and service department, it has been announced. He will be succeeded in the New York organic chemical sales office by **Robert H. Endres,** who has been serving the Pittsburgh territory.

Mr. Williams will be concerned with the development of markets for the line of fatty acids and organic chemical derivatives. Among his initial assignments will be the coordination of all phases of the company's extensive program on the utilization of dimer acid in the production of orethane foam.

He holds Bachelor's degrees from the University of Chicago and the University of Wisconsin.

SUN CHEMICAL

Frank W. May has been named vice president and general manager of Ansbacher-Siegle Corp., a subsidiary of the firm, it has been announced.

Mr. May has been associated with Ansbacher-Siegle since 1957, when he joined the company as plant manager. The following year, shortly after the firm acquired Ansbacher-Siegle, he was named general manager.

A graduate of Rutgers University School of Chemistry, Mr. May has been associated with the chemical manufacturing industry for the past twenty years. After leaving the university, he was associated for a brief period with the plastics and pharmaceutical industries before joining the Harmon Color Works.

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NEVILLE

The following personnel changes have been announced:

J. B. Steen

James B. Steen, who has been assigned to the Pittsburgh, Philadelphia, Baltimore and West Virginia areas, is a graduate of Pennsylvania State University where he majored in science.

Dale DeBlander, a graduate of Marietta College with a chemistry major, has been assigned to serve customers in Ohio, Southern Indiana, Kentucky and Detroit. Both Mr. DeBlander and Mr. Steen recently completed the company's sales trainee program.

David N. Clark, formerly with the technical service department, will now be located in Anaheim, Calif., where the firm's newly built plant is located. He previously was sales representative in Ohio and the Middle West.

ADVANCE SOLVENTS

A. John Clepea has been appointed to head the Cleveland office, it has been announced.

A. J. Clepea

Mr. Clepea was formerly in trade sales and industrial maintenance sales for E. I. DuPont de Nemours & Co. at Cleveland and Chicago. A native of Cleveland, Mr. Clepea is a graduate of the Kent State University, Kent, Ohio. As Cleveland representative, Mr. Clepea will call on manufacturers in the coatings industry. His eight years' experience at DuPont have given him excellent background in helping to solve paint problems for the company's customers.

BLAW-KNOX

Reno J. White has been appointed assistant manager of the fats and oils department, it has been announced.

A graduate of Villanova University with a B. S. degree in chemical engineering, Mr. White joined the firm in 1946. Since then he has held responsible positions as process and project engineer on numerous engineering and construction projects in the fats and oils, as well as the general chemical field.

W. P. FULLER

R. P. Emery, manager of the Tacoma branch, has been appointed Northwest region director of the company's Community Services Division, it has been announced.

Mr. Emery has been associated with the firm for 36 years.

NORTHEASTERN

Stephen Saletros, Jr. has been named sales-service representative for urethanes and emulsions with headquarters in New York it has been announced.

S. Saletros

Mr. Saletros is a graduate of St. John's with a B. S. in Chemistry, and has spent considerable time in the laboratory working on development of emulsions and polyurethane coatings.

GLIDDEN

Robert B. Woodward has been appointed sales promotion manager of the paint division, it has been announced.

R. B. Woodward

In his new capacity, Mr. Woodward will be responsible for the development and coordination of sales promotion activities of the paint division and will maintain close contact with the division's sales organization. In addition, he will work with the creative staffs of Glidden's advertising department and agency to achieve maximum effectiveness of all efforts.

Mr. Woodward joined the firm in 1948 as a trade sales trainee in the firm's Pacific Region where he served on a sales territory and later handled merchandising and dealer promotions for the region. In 1955 he joined the headquarters staff as manager of related products and became assistant merchandising manager in 1958.

Married and the father of one child, Mr. Woodward attended Trinity College in Hartford, Connecticut.

NOPCO

Dr. John E. Ward has become resident manager of Nopco Chimie S. A., Fribourg, Switzerland, it has been announced. At the same time, the appointment of **A. Howard Stuewe,** who replaces Dr. Ward as technical manager of the Foreign Department-Industrial, has been announced.

Dr. Ward, who joined the firm in 1951, is a graduate of Wabash College, with an A. B. degree in chemistry. He also holds M. S. and Ph. D. degrees in chemistry from the Institute of Paper Chemistry.

Mr. Stuewe comes to the firm from the Stauffer Chemical Company, where he was engaged in market research and commercial chemical development. He will be responsible for the development and marketing of new products.

LANDERS-SEGAL

Jerome Stern, has been appointed sales representative for Maryland, Washington, D. C., and Virginia.

Mr. Stern will have charge of the sale of dry colors, flushed colors, and water dispersions to manufacturers of paints and industrial products.

NUODEX PRODUCTS

Chester F. Koda has been appointed chief of the microbiological laboratory, it has been announced.

Dr. Koda, who has been senior microbiologist for research and development activities, holds a doctorate in microbiology and has had four and one-half years of specialized industrial training in the deterioration field.

Following his graduation from the University of Scranton, Dr. Koda spent three years as a chemist for American Cyanamid Company, and following his Doctorate at Syracuse, he held a research fellowship at the Pharmacology Department, New York State College of Medicine, Syracuse, N. Y.

U. S. STONEWARE

David H. Pyle has joined the company as sales representative in the Philadelphia territory, it has been announced.

Mr. Pyle previously was senior service engineer in the Philadelphia district for Hall Laboratories Division of Hagen Chemicals & Controls, Inc. He received his B. S. degree in chemistry from Akron University.

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ABSTRACTS

The following are abstracts of papers presented at the September 13-18 meeting of the American Chemical Society, Division of Paint, Plastics and Printing Ink Chemistry, in Atlantic City, N. J.

Forecasting Epoxy Resin Markets.

By J. R. Willner, Roger Williams Technical & Economic Services, Inc., Princeton, N. J.

An estimate of the total consumption of epoxy resins in 1966 is developed. Several methods of arriving at the forecast are employed. A reasonable compromise results. Surface coating markets are emphasized. Past growth is also studied. A comparison between expanding pound sales and dollar sales is made. Work is the result of much literature searching and many field calls over the past several years.

Polymerization of Epoxide Polymers By Electrical Resistivity Techniques

By R. W. Warfield and M. C. Petree, U. S. Naval Ordnance Laboratory, White Oak, Silver Spring, Md.

Electrical resistivity measurements made isothermally during polymerization have been used to study the bulk polymerization of both amine and acid anhydride polymerized epoxide polymers. Whenever possible, kinetic data have been calculated. The over-all activation energy (E_a) for the polymerization of amine polymerized epoxide polymers was found to be between 11 and 17 kcal. per mole, depending on the amine used. After polymerization was complete, the activation energy (E_c) for the electrical conduction process in the solid polymers was determined to be between 31 and 38 kcal. per mole. The reactions with the amines proceed at a much greater rate and in a different manner than when the polymerization is conducted with maleic anhydride. The results of this study indicate that resistivity measurements are sensitive to the extent of polymerization and can be used to follow the rate of polymerization.

Influence of Amines on Cure of Epoxy-Anhydride Systems

By Kenneth Cressy and John Delmonte, Furane Plastics, Inc., Los Angeles, Calif.

A wide variety of amines have been evaluated which influence the curing characteristics of epoxy-anhydride systems, and this paper discusses the most effective group or groups of amines. Some primary amines and polyamides produced immediate gelation in the epoxy-anhydride reaction; therefore further tests were not conducted. A group of tertiary amines produced faster gel times and lower weight losses at elevated temperatures, indicating a more complete reaction resulting in greater thermal stability of the cured material. Some mercapto compounds were equally effective in accelerating the cure of epoxy-anhydride systems.

By varying the concentration of certain tertiary amines, an optimum was found which demonstrated more effective curing of the epoxy-anhydride and thus greater thermal stability. This optimum was found to lie between 2 and 5% by weight of amine. In other tests these same percentages gave improved electrical and physical properties of the cured materials.

The influence of specific catalysts upon the cure of epoxy-anhydride systems is pronounced. No clear-cut relationship between the structure of the amine and its influence was determined, though a group of tertiary amines proved to be most effective. Methods of obtaining optimum combinations are discussed, which may serve as useful guideposts in further studies.

Epoxy Resin Varnishes Based on Liquid Epoxy Resins. Application of Glycidyl Ether Reactivities

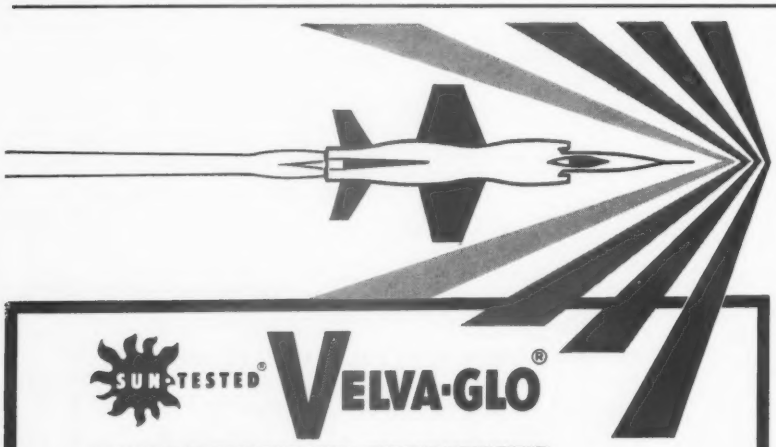
By John Wynstra, Raymond P. Kurkjy, and Norman H. Reinking, Research Department, Union Carbide Plastics Co., Division of Union Carbide Corp., Bound Brook, N. J.

The selective manner in which glycidyl ethers can be made to react with carboxylic acids and phenols in the presence of base catalysts has been exploited to furnish a novel method of preparing epoxy resin varnishes from a liquid epoxy resin, bisphenol A, and a drying acid. Esters were made which were similar to the varnishes made from the solid epoxy resins and the same drying acid. The new varnish process has enough versatility to make possible completely different compositions.

Chemical Structure of Cured Epoxy Resins

By W. Fisch and W. Hofmann, CIBA Ltd. Basle, Plastics Division, Basle, Switzerland.

In continuation of work on the curing mechanisms and chemical structure of epoxy resins cured with dicarboxylic anhydrides, new methods of analysis have been developed which allow determination of all essential values, resulting during the course of curing, and of the cured resin structure, such as the epoxy, hydroxyl, anhydride, diester, and newly formed ether content. Simultaneous to the determination of chemical change during curing,



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Oct. 20-24. 24th Paint Industries' Show, Convention Hall, Atlantic City, N. J.

Oct. 22-24. 37th Annual Meeting of the Federation of Paint & Varnish Production Clubs, Convention Hall, Atlantic City, N. J.

PRODUCTION CLUB MEETINGS

Baltimore, 2nd Friday, Park Plaza Hotel.

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C.D.I.C., 2nd Monday.
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Dayton — Nov., Feb., April, Suttmilers.
Columbus — Jan., June, Sept., Fort Haves Hotel.

Cleveland, 3rd Friday, Cleveland Engineering & Scientific Center.

Dallas, 1st Thursday after 2nd Monday, Melrose Hotel.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, 3rd Monday, Sabella's Restaurant, San Francisco.

Houston, Monday prior 2nd Tuesday, Rams Club.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, University Club, Boston.

New York, 1st Thursday, Brass Rail, 100 Park Ave.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, 3rd Thursday, Washington Athletic Club, Seattle, Wash.

Philadelphia, 3rd Wednesday, Philadelphia Rifle Club.

Pittsburgh, 1st Monday, Gateway Plaza, Bldg. 2.

Rocky Mountain, 2nd Monday, Republican Club, Denver, Colo.

St. Louis, 3rd Tuesday, Kings-Way Hotel.

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Toronto, 3rd Monday, Oak Room, Union Station.

Western New York, 1st Monday, 40-8 Club, Buffalo.

some physical properties such as density, dielectric constant, and dissipation factor were evaluated at reaction temperature and at room temperature, enabling the elucidation of relationships between chemical structure and physical properties. The density of specimens measured at room temperature goes through a maximum at the beginning of curing. As demonstrated by analytical data, the chemical structure of cured resins is dependent on the curing temperature. Furthermore, the effect of various carboxylic acids on the curing reactions is evaluated.

Chemistry of Triphenyl Phosphite-Modified Epoxy Resins

By H. D. Barnstorff, D. P. Ames, and D. H. Chadwick, Monsanto Chemical Co., St. Louis, Mo.

The mode of action of triphenyl phosphite (Mod-Epox) in polyamine-cured epoxy resins containing this unique reactive diluent has been defined.

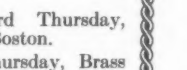
By nuclear magnetic resonance and model resin systems it was shown that the diluent enters the polymer through a transesterification reaction between the phosphite ester and the resin's hydroxyl groups. The transesterification process is catalyzed by amines. Its driving force is capture of phenol released during the ester interchange step by the resin's unreacted oxirane rings.

The data supporting these conclusions are presented and some comments are made concerning triphenyl phosphite's mode of action in acid anhydride-cured epoxy resins.

Epoxy Resins From Fats, Effect of Structure of Epoxystearamides on the Physical Properties of their Phthalic Anhydride cured Resins

By Leonard L. Gelb, Waldo C. Ault, William E. Palm, Lee P. Witnauer and William S. Port, Eastern Regional Research Laboratory, Philadelphia 18, Pa.

Resins were made from oleic and linoleic acids and diamines by curing a variety of epoxidized diamides having the generalized structural formula with



equivalent weights of phthalic anhydride in the presence of 2.5 weight % of benzyldimethylamine at 150° to 160°C. A was either $CH_3(CH_2)_7CH\text{-}CH\text{-}(CH_2)_7$- or $CH_3(CH_2)_4CH\text{-}CH\text{-}CH_2\text{-}CH\text{-}CH(CH_2)_7$ R was alkylene or arylene, and both R′ radicals were either H or CH_3. In a special case, $R(NR')_2$ was piperazinyl.

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The dioleamides of ethylenediamine, *N,N'*-dimethylethylenediamine, hexamethylenediamine, and piperazine, as well as the dilinoleamides of ethylenediamine and hexamethylenediamine, were prepared in 95% purity (minimum) by condensation of methyl oleate or methyl linoleate with the respective diamines in the absence of a catalyst. Aromatic dioleamides were synthesized by acylation of *p*-phenylenediamine and benzidine with vinyl oleate under acid catalysis, and by a reaction of 3,3'-bitoluene 4,4'- diisocyanate with oleic acid. Each of these diamides was epoxidized with commercial peracetic acid to the corresponding polyepoxides in 95% purity, determined by oxirane analysis.

All of the resin specimens were subjected to physical tests to determine heat distortion temperature (HDT), modulus of elasticity, tensile strength, and percentage elongation. Because the position and number of the epoxide groups and the curing agent were constant for the oleamide series, variations in the physical properties of the resins were attributed to the structure of the diamine (R). The following are general observations between the diamine structure and the physical properties.

The heat distortion temperature increases in the order aliphatic, alicyclic, aromatic. A short-chain aliphatic diamine gives a higher heat distortion temperature than a long-chain aliphatic diamine. The presence or absence of a hydrogen atom on the nitrogen has no effect on the heat distortion temperature, and consequently, hydrogen bonding plays no part in contributing to the rigidity of the cross-linked structure. The tensile strengths and moduli of elasticity follow the same pattern as the heat distortion temperature. The long-chain aliphatic diamine (hexamethylenediamine) resin shows a fourfold increase in per cent elongations at break over the short chain aliphatic diamine (ethylenediamine). The heat distortion temperature for the amide resin from ethylenediamine is 58° higher than that of the corresponding ester resin from ethylene glycol.

Mechanism of Drying Oils

By Frank R. Mayo, Stanford Research Institute, Menlo Park, Calif.

The reactions of organic free radicals with oxygen to give organic peroxy radicals are so fast that this reaction is the only one that occurs when sufficient oxygen is present. Normal vinyl polymerization cannot occur in the presence of oxygen; they are replaced by copolymerizations with oxygen [Mayo, Miller, and Russell, J. Am. Chem. Soc., *80*, 2465-507 (1958)]. Only two mechanisms for drying of oils in air seem to be admissible. (1) Copolymerization of conjugated oils with oxygen by a free radical mechanism to give polymers cross-linked by oxygen. Ether links may result from subsequent decompositions of peroxides, but no carbon-carbon bonds may be formed. (2) Diels-Alder condensation of conjugated carbon-carbon double bonds with α,β-unsaturated ketones. This condensation is a nonradical reaction, without any oxidation, but a free radical oxidation is required to introduce unsaturated ketone groups into the oil. For either mechanism, relative reactivities of model compounds indicate that, for efficient drying, some 1,4-double bonds must be converted to conjugated 1,3-double bonds either in the processing of the oil or in the course of its oxidation.

Performance Characteristics of Epoxy Resins of Tetrachloro Bisphenol A. R.

By A. Cass and E. T. Reaville, Monsanto Chemical Co., St. Louis, Mo.

This paper presents the properties of the diglycidyl ether of tetrachloro bisphenol A cured with some anhydrides. It compares the properties of the diglycidyl ether of bisphenol A cured with chlorendic anhydride to those of the diglycidyl ether of tetrachloro bisphenol A cured with phthalic anhydride. The phthalic anhydride-cured resin made with tetrachloro bisphenol A is flame retardant, has a high heat distortion temperature, good strength properties, excellent resistance to solvents, and good pot life.

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Polyesters From Epoxides and Anhydrides

By R. F. Fischer, Shell Development Co., Emeryville, Calif.

The reaction of monoanhydrides and terminal epoxides to give linear polyesters is 97 to 99% specific in the presence of tertiary amines. Products with molecular weights up to 18,400 have been obtained; the only termination reaction detected (within the limits of analytical accuracy) has been due to hydroxyl-containing impurities in the reagents. With most epoxides the products are mixtures of stereoisomers which soften below 100°. Ethylene oxide, however, gives highly crystalline products melting at 110° to 163-165°, depending on the anhydride. Cyclohexene oxide also gives products softening higher than 110°. The use of functional epoxides gives polyesters with side chains modifying their physical and chemical properties. Up to 30% mole of maleic anhydride has been incorporated, giving styrene-compatible structural polyesters.

Within limits, the rate, molecular weight, and product composition are independent of the monomer concentrations. The degree of specificity drops to ca.80% with cyclohexene oxides and to ca.60% with alkyl epoxy stearates.

Epoxypolyolefins. Anhydride-Polyol Cure Systems.

By Charles A. Heiberger, Murray H. Reich, Christian W. Johnston, and Gene Nowlin, Chemical Research and Development Center, Food Machinery and Chemical Corp., Princeton, N. J.

The curing characteristics and the mechanical, heat distortion temperature and age-resistance properties of a novel unsaturated epoxy polymer, Resin A20-75, were investigated using different combinations of various anhydrides and polyols. Very rapid cures of the resin were readily achieved at room temperature using prereacted mixtures of maleic anhydride and propulene glycol. Regulation of the extent of prereaction of the anhydride with the polyol was a convenient means of controlling the cure rate of the resin.

Extensive studies of this cure system were conducted in which the curatives were added separately to the unsaturated epoxy resin. Properties of the cured resin could be varied over a wide range by altering the type and/or concentration of either the anhydride or the polyol. Use of liquid or low melting anhydrides such as hexahydrophthalic or methylendomethylene-tetrahydrophthalic in place of maleic anhydride in these cure formulations tended to lower the flexural strength and heat distortion temperature of the resin. Changing the type of polyol to ethylene glycol, 2,3-butylene glycol, or glycerol did not change the flexural properties of the cured resin.

Extremely high head distortion temperatures were attained with cure systems containing maleic anhydride and a polyol by properly adjusting the cure schedule and/or adding suitable modifiers. Cured epoxy resin A20-75 also demonstrated excellent age-resistance at high temperatures and displayed small weight losses after 10 weeks at 206°C.

Differential Thermal Analysis of Polyepoxides

By Hugh C. Anderson, U. S. Naval Ordnance Laboratory, White Oak, Silver Spring, Md.

Differential thermal analyses (DTA) have been performed on several typical polyepoxides having different chemical structures. Both the uncatalyzed and catalyzed epoxides were subjected to differential thermal analysis. The differential thermal analysis curves are seen to be characteristic of the different systems. The rate of heating, the concentration of the curing agent, and the extent of cure can alter the differential thermal analysis curve for a particular system. The shapes and positions of the differential thermal

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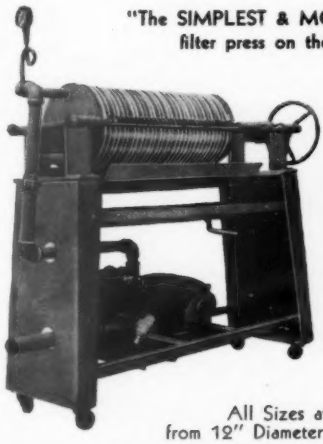

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analysis peaks are dependent on the epoxide, as well as the curing agent. The differential thermal analysis determinations, in conjunction with ultimate percentage weight loss of the samples, give a qualitative picture of the relative reactivities, as well as of the thermal stabilities, of the various systems.

Epoxide-Substituted Vinyl and Acrylate Copolymers

By J. A. Simms, Fabrics and Finishes Department, E. I. du Pont de Nemours and Co., Inc., Wilmington 98, Del.

This paper covers some of the information obtained in Du Pont laboratories on polymers which are multifunctional in epoxide groups. The simplest route to such epoxide functional polymers is the copolymerization of glycidyl methacrylate, GMA (2,3-epoxypropyl methacrylate), with acrylate and vinyl monomers.

Glycidyl methacrylate (GMA) is similar to methyl methacrylate in its copolymerization characteristics. The copolymers can be cross-linked by the same classes of materials that are useful with conventional epoxide resins based on epichlorohydrin and bisphenol A. Similar curing conditions and reactant stoichiometry can also be used.

Three GMA copolymers are described: (1) a phosphated styrene/GMA (85/15) copolymer which is thermosetting and can be used as an appliance finish vehicle to yield enamels with excellent resistance properties, (2) an ethyl acrylate/GMA (97/3) elastomer which can be vulcanized with amines or diacids, and (3) a methyl methacrylate/GMA (70/30) copolymer which can be cross-linked at room temperature with amines.

These copolymers have good resistance to yellowing because of their aliphatic hydrocarbon backbone. The molecular weight and epoxide functionality can be varied over wide ranges.

Glycidyl Ethers of Mononuclear Polyhydric Phenol-Ketone Condensation Products

By John B. Rust and Charles L. Segal, Materials Research Department, Microwave Laboratory, Hughes Aircraft Co., Culver City, Calif.

Polyhydric phenol-ketone resins were prepared by the condensation of resorcinol and acetone in the presence of an acid catalyst; the resulting fusible resins were soluble in aromatic, aliphatic, and oxygenated solvents. Varying mole ratios of resorcinol and acetone were used; a maximum reaction ratio of two moles of ketone per mole of phenol was established. The weight-average molecular weight of these resins, as determined by light-scattering measurements, was approximately 3000.

The phenol-ketone resins were converted to glycidyl ethers by reaction with excess epichlorohydrin in a basic medium. The resulting fusible epoxy resins were soluble in oxygenated solvents, such as acetone. Epoxy equivalents per unit weight were determined on a series of resins prepared with varying amounts of caustic and an excess of epichlorohydrin. The melting point of the resin decreased, and the number of epoxy equivalents per 100 grams increased, as the amount of caustic was increased: melting points varied from 120° to 175°C., and epoxy equivalents per 100 grams varied from 0.4 to 0.2. The resulting epoxy resins were hardened by conventional epoxy hardeners to produce insoluble, infusible plastic materials.

Several other polyhydric phenols and several different ketones were condensed and epoxidized to produce a series of multifunctional epoxy resins ranging from viscous liquids to hard solids. The epoxy resins were also converted into infusible, insoluble plastics with conventional hardening agents.

The epoxy resins developed in this study have proved useful as additives to conventional diepoxides, bringing about an increased thermal stability and improved adhesive properties.

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Some Polyglycidyl and Polyepoxybutyl Derivatives of Phenols

By David Aelony, Central Research Laboratories, General Mills, Inc., Minneapolis, Minn.

Numerous polyglycidyl and polyepoxybutyl derivatives of phenols were prepared. They were cured with amines and anhydrides to establish the influence of the structure of the polyepoxy compounds on the hardness and heat-distortion temperatures of the cured resins.

Methods of preparation involve Claisen rearrangements of allyl ethers of phenols which result in allyl phenols. When a sufficient number of allyl groups is present in a phenol, the glycidyl ether of polyallylphenol is made and the compound is epoxidized. Phenols can also be crotylated in the ring with butadiene. The polycrotyl phenol is converted into a glycidyl ether, which is then epoxidized.

Some polyglycidyl phenols when cured with *m*-phenylenediamine gave unusually high Barcol hardnesses and unusually high heat distortion temperatures. Polyepoxybutyl phenols gave still higher heat distortion temperatures when cured with *m*-phenylenediamine. The heat-distortion temperatures were beyond the range of the instrument. Alkyl-substituted phenols converted to polyglycidyl phenols and cured generally give lower heat distortion temperatures than the corresponding phenol derivatives. The polyepoxy compounds described have very low viscosities, which makes them particularly desirable in castings and in solventless paints and varnishes.

The Epoxy Resin-Pyromellitic Dianhydride-Glycol System.

By T. J. Hyde, Sales Development Laboratory, E. I. du Pont de Nemours & Co., Penns Grove, N. J.

The reaction of two moles of pyromellitic dianhydride (PMDA) with one mole of various glycols produced adducts with high solubility (28 to 65%) in ketone or ester solvents. The adducts contained both anhydride and carboxylic acid groups. Coating formulations containing conventional solid epoxy resins and PMDA-glycol adducts were developed which attained an excellent balance of physical properties and solvent resistance after a relatively mild cure of 15 to 30 minutes at 300°F. The shelf life of the formulations was greater than 30 days. The glycol used for most of this work was 2,2-bis[4-(2-hydroxyethoxy) phenyl] propane, which is available as Dow Resin X-2635. When polyporpylene glycol with an average molecular weight of 1080 was used as the glycol component, the cured coating possessed flexibility sufficient to withstand post-forming operations on the steel substrate. Three liquid, polyfunctional epoxy resins could be cured with PMDA-glycol adducts at room temperature in 7 days or less to produce coatings with excellent physical properties and MEK resistance.

Coatings From Cyclohexene Oxide Derivatives.

By C. W. McGary, Jr., C. T. Patrick, Jr., and R. Stickle, Jr., Research Department, Union Carbide Chemicals Co., South Charleston, W. Va.

Drying oil varnishes were prepared from unsaturated fatty acids and diepoxides such as EP-201 (3,4-epoxy-6-methylcyclohexylmethyl 3,4-epoxy-6-methylcyclohexanecarboxylate) using a novel sequence of reactions. The diepoxide and fatty acid were mixed in such proportions that, after reaction at relatively mild temperatures, residual epoxide groups were maintained. In the presence of an initiator such as boron trifluoride, the residual epoxide and generated hydroxyl groups condensed to give a soluble polymeric composition which was very useful in surface coating applications.

Films from these compositions cured rapidly at room temperature and at bake temperatures. The fully cured films had excellent color retention when exposed to ultraviolet light and excellent hardness and flexibility.

Novel Epoxy Resin Formulations Based on Epoxidized Soybean Oil and Het Anhydride

By C. S. Ilardo and B. O. Schoepfle, Hooker Chemical Corp., Niagara Falls, N. Y.

The relatively high cost of conventional epoxy resins has frequently stimulated searches for lower cost systems containing inexpensive epoxidized derivatives. One class of such materials is the epoxy-containing vinyl plasticizers which are derived from unsaturated triglycerides, such as soybean oil.

HET anhydride can harden epoxidized soybean oil to yield resins having heat distortion temperatures of about 63°C. The use of difunctional modifiers, such as bisphenol A, in these systems increases their heat distortion temperature to about 91°C. Solutions of bisphenol A in the epoxidized soybean oil yield higher heat distortion temperatures than prereacted mixtures of the two components.

Typical amine type hardeners have not been found to yield reasonable heat distortion temperatures with epoxidized soybean oil systems. The physical and electrical characteristics of the system derived from a solution containing a 1 to 2 molar ratio of bisphenol A in an epoxidized soybean oil and hardened with 100 parts of weight of HET anhydride are considered as typical of many of the more conventional systems.

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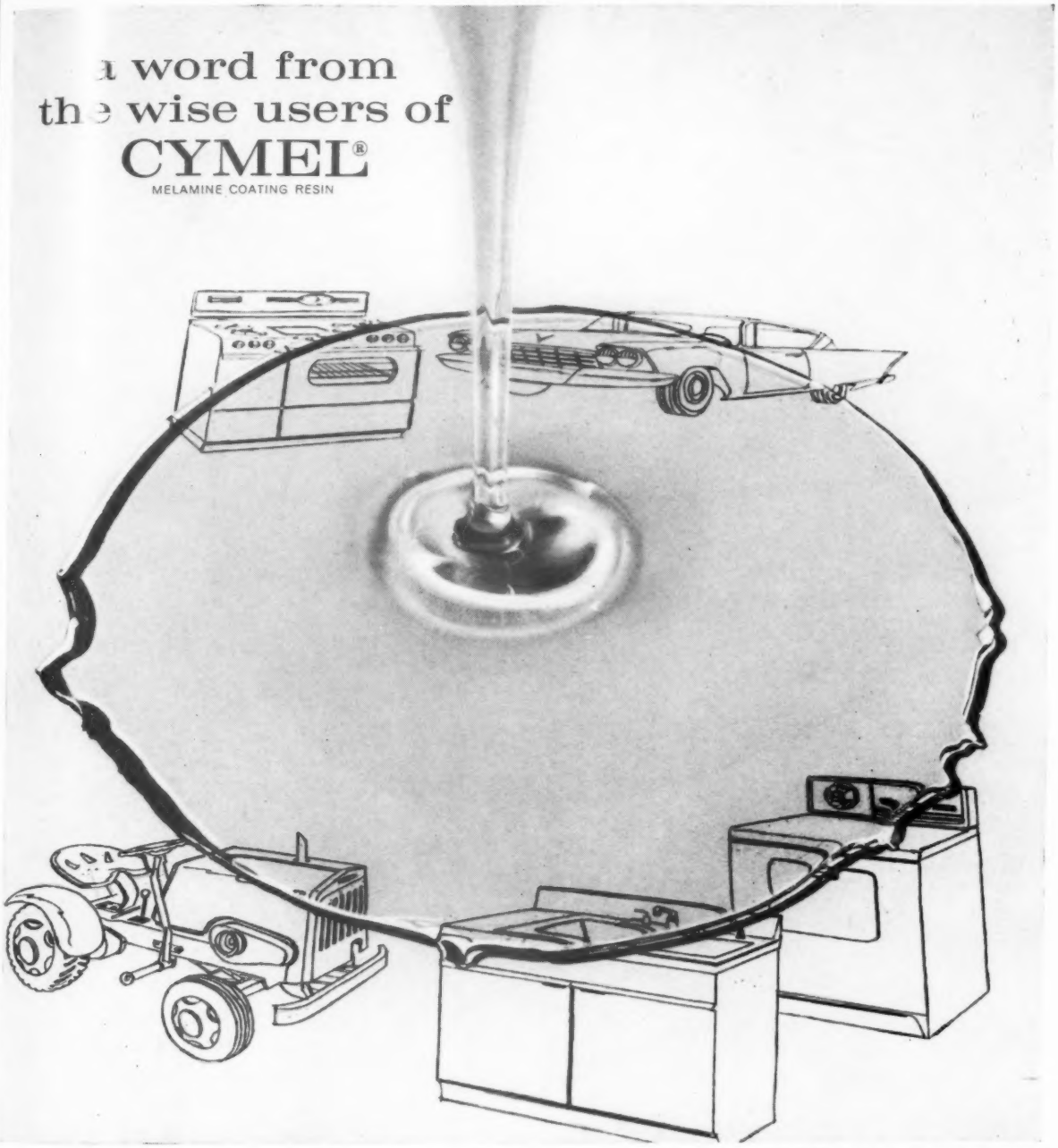

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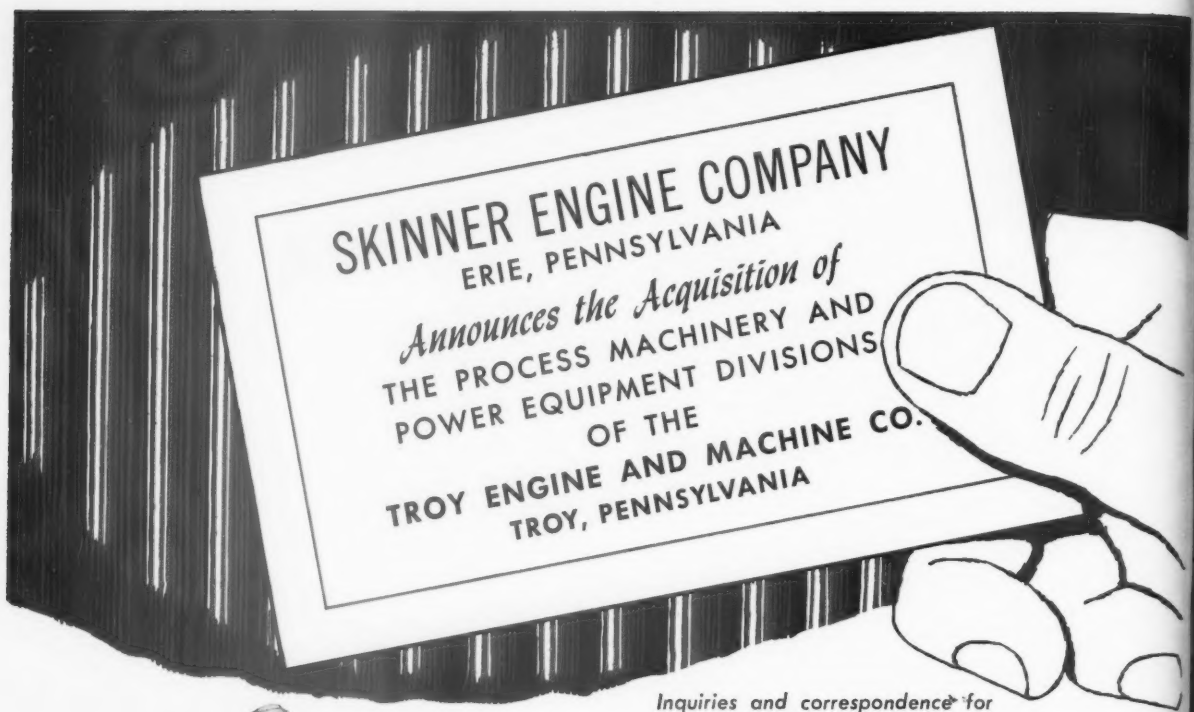

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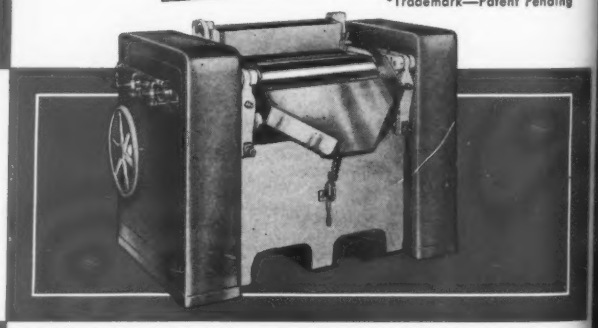

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